Документ подписан простой электронной подписью
Информация о владельце:
ФИО: Мухарямова Лайсан Мухаметовна
Должность: и.о.первого проректора
Дата подписания: 12.03.2026 18:04:43
Уникальный программный ключ:
b57b96507511d4669a7e8b1e807a3d3e7412a55d

Федеральное государственное образовательное учреждение
высшего образования
«КАЗАНСКИЙ ГОСУДАРСТВЕННЫЙ МЕДИЦИНСКИЙ УНИВЕРСИТЕТ»
Министерства здравоохранения Российской Федерации

«УТВЕРЖДАЮ»
Руководитель ОПОП
Декан факультета иностранных
студентов, доцент
_____ Е.С. Кошпаева
24 июня 2025

СБОРНИК СИЛЛАБУСОВ
ДИСЦИПЛИН (МОДУЛЕЙ) И ПРОГРАММ ПРАКТИКИ
ОСНОВНОЙ ПРОФЕССИОНАЛЬНОЙ ОБРАЗОВАТЕЛЬНОЙ ПРОГРАММЫ ВЫСШЕГО ОБРАЗОВАНИЯ

по специальности

33.05.01 Фармация (на английском языке)

Квалификация: провизор
Уровень: специалитет
Форма обучения: очная
Срок обучения: 5 лет
Факультет: Иностранных студентов

Казань, 2025 г.

Federal State Educational Institution of Higher Education
"KAZAN STATE MEDICAL UNIVERSITY"
Ministry of Health of the Russian Federation

"APPROVED"
Head of the GPEP
Dean of the Faculty of International Students,
Associate Professor
_____ E.S. Koshpaeva

DIGEST OF SYLLABUSES
OF DISCIPLINES (MODULES) AND PRACTICAL PROGRAMS
OF THE GENERAL PROFESSIONAL EDUCATIONAL PROGRAM OF HIGHER EDUCATION

in specialty
33.05.01 Pharmacy (medium of instruction: English)

Qualification: pharmacist
Level: specialist
Form of study: full-time
Duration of study: 5 years
Faculty: International students

Kazan, 2025

ОГЛАВЛЕНИЕ

MEDICAL AND BIOLOGICAL PHYSICS 3
INTRODUCTION TO A SPECIALTY. CIRCULATION OF MEDICINES 7
LATIN LANGUAGE 11
CHEMISTRY OF BIOGENIC ELEMENTS 16
HISTORY OF RUSSIA 22
HISTORY OF PHARMACY 25
PHILOSOPHY 31
FOREIGN LANGUAGE 38
FOREIGN LANGUAGE IN PROFESSIONAL ACTIVITIES 55
ORGANIC CHEMISTRY 59
PHYSICAL AND COLLOIDAL CHEMISTRY 67
APPLIED BIOSTATISTICS 76
LIFE SAFETY 80
PHYSIOLOGY WITH THE BASICS OF ANATOMY 88
MICROBIOLOGY 96
ANALYTICAL CHEMISTRY 108
HISTOLOGY, EMBRYOLOGY, AND CYTOLOGY 120
PATHOLOGY 127
BOTANY 140
ASSESSMENT OF THE FUNCTIONAL STATE OF THE HUMAN BODY 153
HYGIENE 157
MEDICAL BIOCHEMISTRY 162
PHARMACOPOEIAL ANALYSIS IN PHARMACOGNOSY 174
METHODS OF PHARMACOPOEIAL ANALYSIS 178
BIOETHICS AND LEGISLATION 185
INFORMATION TECHNOLOGY IN PROFESSIONAL ACTIVITY 189
ELECTIVE DISCIPLINES IN PHYSICAL EDUCATION AND SPORTS 194
GENERAL PHARMACEUTICAL CHEMISTRY 207
GENERAL PHARMACEUTICAL TECHNOLOGY 222
PHARMACOLOGY 233
MEDICAL AND PHARMACEUTICAL COMMODITY SCIENCE 239
PHARMACOGNOSY 246
BASICS OF BIOTECHNOLOGY 262
LEGAL BASIS OF THE PHARMACIST'S ACTIVITY 269
MEDICINES FROM NATURAL RAW MATERIALS 274
MANAGEMENT AND ECONOMICS OF PHARMACY 280
PHARMACEUTICAL ECOLOGY 298
TOXICOLOGICAL CHEMISTRY 303
BIOPHARMACY 314
SPECIAL PHARMACEUTICAL CHEMISTRY 317
SPECIAL PHARMACEUTICAL TECHNOLOGY 327
CLINICAL PHARMACOLOGY 340
FIRST AID 346

PHARMACEUTICAL INFORMING.....351
PHARMACEUTICAL LOGISTICS.....355
PHARMACEUTICAL MARKETING.....357
CHROMATOGRAPHIC METHODS IN CHEMICAL AND TOXICOLOGICAL ANALYSIS.....361
COMMODITY ANALYSIS DURING RECEIVING PHARMACEUTICAL STOCK.....366
PROPEDEUTIC PRACTICE: INTRODUCTORY PHARMACY PRACTICE EXPERIENCE.....369
PRACTICE ON BOTANY.....374
EDUCATIONAL PRACTICE ON GENERAL PHARMACEUTICAL TECHNOLOGY.....384
FIRST AID PRACTICE.....392
PRACTICE OF QUALITY CONTROL OF MEDICINES.....399
MANUFACTURING PRACTICE ON PHARMACEUTICAL TECHNOLOGY.....402
MANAGEMENT AND ECONOMICS OF PHARMACY PRACTICE.....410
PHARMACEUTICAL COUNSELLING AND INFORMING PRACTICE.....413

MEDICAL AND BIOLOGICAL PHYSICS

Teachers: PhD Elena Zhivotova
Building, Department, classroom # NUK, Department of Medical and Biological Physics, 509, 501
Contact details:
Telephone number: 89381530078 (PhD Elena Zhivotova)
E-mail address: elzhivotova@gmail.com
Office and working hours: 522 (9-17)

Total hours — 108:
- Lectures 16 hours;
- Practical classes 45 hours;
- Independent work 47 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=3336).

Course objectives: The purpose of mastering the discipline
The aim of achievement by medical students of mastery of course Medical and biological physics is the formation of systematic knowledge on physical properties of matter and physical processes taking place in biological objects including human body.
Tasks of the discipline:
To form knowledge in the field of:
usage of physics concepts and procedures in pharmacy;
physical basics of laboratory analysis.

Course topics:
Calendar plan of lectures
Properties of liquids. Physics of Blood and Circulatory System. Flow Rate and Its Relation to Velocity. Equation of continuity. Branching of the flow. Bernoulli's Equation. Viscosity. Laminar and turbulent flow. Auscultation method of blood pressure measurement.

Poiseuille's Law. Resistance to flow in vascular system. Frank's model (two-element windkessel). Pulse wave. Surface tension
Sound. Physics of Hearing. Physics of Ultrasound Imaging.
Biological membranes. Fluid Mosaic Model. Transport of substances through biological membranes. Biopotentials. Physics of electrocardiography.
Geometric optics. Biological and medical applications. Total internal reflection in medicine. Fiber Optics: Endoscopes. Lenses. Ray diagrams. Vision Correction. Microscopes.
Wave optics. Interference, diffraction, polarization. Biological and medical applications.
Radioactivity. Biological Effects of Exposure to Radiation. Radiation dosimetry. Ionizing radiation in diagnostics and therapy.
Atomic and molecular spectroscopy. Light absorption. Colorimetry. Spectroscopy of Biological Macromolecules. Photoelectric effect. Photomultiplier tubes. X-ray tubes. Medical uses of X-rays. Computed tomography.

Calendar plan of laboratory classes
Safety rules in physical laboratory. Determination of surface tension by capillary rise method. Determination of the surface tension by the drop counting method.
Determination of the viscosity by the Ostwald viscometer. Determination of the viscosity by the falling ball method.
Physical basics of the pure tone audiometry. Recording pure tone audiograms.
Physical basics of ultrasound diagnostics.
Module on topics 1-4.
Registration and interpretation of electrocardiograms.
Physical basics of the auscultation method of blood pressure measurement.
Microscope and measurement of microobjects.
Refractometry. Optical Fiber Loss and Attenuation.
Module on topics 5-8.
Interferometry measurement of concentration. Measuring the wavelength of monochromatic light by a diffraction grating. Studying the diffraction of white light.
Verification of Malus law. Polarimetry measurement of concentration.
Radioactivity. Interaction of nuclear radiation with matter. Detectors of ionizing radiation
Atomic and molecular spectroscopy. Photoelectric effect. Light absorption. Colorimetry.
Module on topics 9-12. Outcoming testing. Final test.

Text books and required supplies:
Davidovits, Paul. Physics in Biology and Medicine. Fifth Edition. Elsevier Science. 2018. – 358 p.
Hobbie, Russell K. R. Intermediate Physics for Medicine and Biology. 4th Edition. Springer. 2015. – 616 p.
College Physics. OpenStax. Open Education Resource (OER) LibreTexts Project.
Evaluation and grading:
Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of test questions

1. The auscultation method of blood pressure measurement is based on the detection of Korotkoff sounds caused by
   A. turbulent blood flow in an artery.
   B. laminar blood flow in an artery.
   C. turbulent blood flow in capillaries.
   D. laminar blood flow in capillaries.

   Correct answer: (a)
   Correct answer - 1 point.

2. An optician prescribes a lens of power -1.5 D for correction of vision of a person. What kind of defect in vision is the patient suffering from? What is the focal length of the corrective lens? What is the nature of the corrective lens?

A. ~Hypermetropia; 67 cm; convex lens.
B. Myopia; -67 cm; convex lens.
C. Hypermetropia; 67 cm; concave lens.
D. Myopia; -67 cm; concave lens.

Correct answer: (d)
Correct answer - 1 point.

3. Absorption spectrum results when an electron in an atom undergoes a transition from
   A. lower energy level to a higher one.
   B. higher energy level to a lower one.
   C. intermediate levels.
   D. all of the mentioned.

Correct answer: (a)
Correct answer - 1 point.

4. Proteins absorb strongly at
   A. 260 nm.
   B. 280 nm.
   C. 420 nm.
   D. 680 nm.

Correct answer: (b)
Correct answer - 1 point.

Example of problems

1. During ultrasonographic examination, a transducer sends a pulse of ultrasound and receives an echo 20 microseconds later. Calculate the depth of object from which the signal was reflected. Assume that the speed of sound through human tissues is 1540 m/s. Write the answer in millimetres.

Correct answer: 15.
Correct answer - 1 point.

2. A sugar solution 20% rotates the plane of polarization through an angle of 21 degrees. Find the concentration of sugar in other solution, if under the same conditions the plane of polarization is rotated through an angle of 12 degrees. Write the value rounded up to the second decimal place.

Correct answer: 11.43.
Correct answer - 1 point.

EVALUATION OF THE MODULE ANSWER

The question card of the module consists of 20 tasks (12 theoretical MCQ, 4 practical MCQ and 4 numerical answer problems).
Each question is evaluated by 5 points.

INTRODUCTION TO A SPECIALTY. CIRCULATION OF MEDICINES

Teachers: Director of Institute of Pharmacy, Associate professor Moustafine Ruslan Ibragimovich, PhD; Assistant of Institute of Pharmacy Voronina Elizaveta Alexandrovna
Building, Department, classroom #: Institute of Pharmacy, Amirkhana, 16, room 303
Contact details:
Telephone number: +7 (843) 5213953 (Evseeva Elena Vyacheslavovna)
E-mail address: 2367492@mail.ru
Office and working hours: 313 (9-16)

Class hours:
Total 108 h:
Lectures - 16 hours;
Practical classes – 45 hours;
Independent work (self-study) – 47 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Practical classes are usually devoted to detailed study of specific topics and it is being held in each academic group separately. They involve active participation of students in problem discussion. It requires preliminary preparation by the student.
Self-study is work with the special literature or teaching materials (literature sources, video and audio material, multimedia programs) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=1808).

The purpose of mastering the discipline.

The purpose of the discipline “Introduction to a specialty. Circulation of medicines” is the formation of students' primary knowledge, skills and abilities to provide qualified, timely, affordable, high-quality pharmaceutical care and to ensure the safety of medicines.

Tasks of the discipline.
1. Acquisition of theoretical knowledge on the organization of the activities of pharmaceutical enterprises and the provision of medicine assistance to the population.
2. Formation of skills and competence in the use of methods of organization and management of enterprises engaged in the sphere of medicine circulation.
3. Acquisition of skills and competencies in the implementation of activities related to the sale of medicines in accordance with the requirements of the current legal and regulatory documentation.

Course topics:
Calendar plan of lectures:
1. Characteristic of the specialty. The area of professional activity of graduates. General and professional competencies of a specialist.

2. Basic principles of discovery and development of medicines. Assessment of the quality, efficacy and safety of medicines.
3. Manufacture of medicines and medical devices.
4. System of medicines providing in Russia and in the world. Pharmaceutical terminology.
5. Regulatory, organizational and economic foundations of state regulation in a field of circulation of medicines.
6. Pharmacy warehouse, structure, principles of activity.
7. Pharmacy organizations, structure, principles of activity.
8. Pharmaceutical personnel management system.

Calendar plan of practical classes:

1. Characteristic of the specialty. The area of professional activity of graduates. General and professional competencies of a specialist.
2. Basic principles of discovery and development of medicines. Assessment of the quality, efficacy and safety of medicines.
3. Manufacture of medicines and medical devices.
4. General characteristics and possible classification of pharmaceutical products.
5. Requirements for the production and use of modern medicine delivery systems.
6. System of medicines providing in Russia and in the world. Pharmaceutical terminology.
7. Regulatory, organizational and economic foundations of state regulation in a field of circulation of medicines.
8. Pharmaceutical warehouse, structure, principles of activity.
9. Main methods of promoting products on pharmaceutical market.
10. Pharmacy organizations, structure, principles of activity.
11. Pharmacy organizations, structure, principles of activity (excursion to KSMU Educational pharmacy).
12. Pharmaceutical personnel management system. Pharmaceutical ethics.
13. Creation of safe conditions and labor protection of pharmaceutical personnel.
14. System of sanitary regime in pharmacy organizations.
15. Project «My career in pharmaceutical industry».

Textbooks and required supplies:

1. Management and Economics of Pharmacy: textbook / edited by I. A. Narkevich. - Moscow: GEOTAR-Media, 2021. - 928 p. - ISBN 978-5-9704-6863-0. - Text: electronic // Electronic library system "Student consultant": [site]. - URL: https://www.studentlibrary.ru/book/ISBN9785970468630.html
2. Laboratory manual «Introduction to the speciality. Circulation of medicines» for English-speaking students of the Institute of Pharmacy / R.I. Moustafine, Ya.V. Gribova, N.N. Porfyrieva, V.R. Timergalieva — Kazan; KSMU, 2021. — 93 p.

Evaluation and grading:

Monitoring progress is carried by tests carried out on each class and final test.

Routine performance assessment (tests during classes) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”.

Unsatisfactory mark during routine performance evaluation or absence (including lectures) is considered to be a student academic debt. In order to rework the debt, student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher.

Overall student rating is build up from lecture and class attendance, test results and final test result.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during breaks
- Using phone is allowed only during breaks

Example of tests for the classes

1. Give a correct definition to medicines.

A. substances or combinations thereof coming in contact with the human or animal body, penetrating into the organs and tissues of the human or animal body, used for prophylaxis, diagnostics (except for substances or combinations thereof not coming in contact with the human or animal body), treatment of disease, rehabilitation, as well as for maintenance, prevention or interruption of pregnancy, as may be derived from blood, blood plasma, human or animal organs and tissues, plants and minerals by synthesis methods or using biological technologies

B. medicines in the form of active substances of biological, biotechnological, mineral or chemical origin, being pharmacologically active, meant for manufacturing and compounding of medicinal products and determining efficacy thereof

C. substances of organic or non-organic origin used in the process of manufacturing and compounding of medicinal products in order to give the latter required physicochemical properties

D. dosage forms of medicines used for prophylaxis, diagnostics, treatment of disease, rehabilitation, as well as for maintenance, prevention or interruption of pregnancy

2. Give a correct definition to dosage form.

A. medicinal products of biological origin meant for immunological diagnostics, prophylaxis and treatment of diseases

B. a condition of a medicinal product corresponding to the modes of administration and use thereof, and ensuring the required therapeutic effect

C. substances of organic or non-organic origin used in the process of manufacturing and compounding of medicinal products in order to give the latter required physicochemical properties

D. dosage forms of medicines used for prophylaxis, diagnostics, treatment of disease, rehabilitation, as well as for maintenance, prevention or interruption of pregnancy

3. Give some examples to dosage forms (one correct answer).
A. Powder, ointment, excipient
B. Solution, powder, ointment
C. Tablets, herb, powder
D. Powder, tablets, fruit

4. By which federal law list of vital and essential medicines is regulated?
A. Federal Law 61 “On circulation of medicines”
B. Federal Law 3 “On narcotic medicines and psychotropic substances”
C. Federal Law 323 “On the basics of protecting the health of citizens in the Russian Federation”
D. Federal Law 52 dated March 30th, 1999 “On the sanitary and epidemiological well-being of the population”

5. Give a correct definition to falsified medicine.
A. a medicine of biological origin meant for immunological diagnostics, prophylaxis and treatment of diseases
B. a medicine that does not meet requirements of pharmacopoeial item or, in its absence, requirements of normative documentation or normative document
C. a medicine accompanied by false information about its composition and (or) manufacturer
D. a medicine in circulation in violation of civil law

Final test for the subject Introduction to a specialty. Circulation of medicines
1. The following processes are not subject to licensing in the pharmacy:
A. Production
B. Storage
C. Clinical research
D. Wholesale

2. An international standard of ethics and quality of research that describes the rules for the development, conduct, documentation and reporting of research that involve human participation as a test subject is called:
A. Good Clinical Practice
B. Good Laboratory Practice
C. Good Distribution Practice
D. Good Pharmacy Practice

3. Types of classifications of pharmacies (a few correct answers):
A. By ownership
B. By the nature of production activities
C. By serviced contingent
D. By the presence of an attached small retail network

4. Public Relations is:
A. Any form of communication used by a firm to inform, persuade, or remind potential customers of its products, services, ideas and social activities
B. Technology for creating and implementing the image of the goods, the company in order to consolidate this image as an ideal and necessary in life
C. Type of marketing communications, a set of measures to promote the goods along the route of promotion from the manufacturer to the consumer in order to accelerate the sale of goods

5. Washstands are used to wash hands of staff, equipped with (a few correct answers):
A. Pedal cranes
B. Elbow-driven cranes
C. Synthetic detergent
D. Electric air dryer
E. Capacity with disinfecting solution
F. A towel

Evaluation of Final test for the subject Introduction to a specialty. Circulation of medicines
100 questions are given in the form of tests (MCQ). For each question 1 point is given. Total amount of possible points – 100. Less than 70 points – "unsatisfactory" mark; 70-79 points – "satisfactory"; 80-89 – "good"; 90-100 – "excellent".

LATIN LANGUAGE

Teacher: Prof. Nataliya Nikolaeva
Building, Department, classroom # NUK, Department of Latin Language and Medical Terminology, 532, 534
Contact details:
Telephone number: 89178626508 (Prof. Nataliya Nikolaeva)
E-mail address: natalia.nikolaeva@kazangmu.ru
Office and working hours: 532 (10-16)

Total hours: 144 h
Practical classes: 72 h
Self-study: 36 h
Control: 36 h

Course description:
Practical training is aimed to receive theoretical knowledge and apply it in practice. The skills are developed in solving tasks under the supervision of a teacher.
Self-study is work with the special literature or teaching materials (handbooks, video and audio material, power-points and additional training materials) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=1735).

Course objectives:

The discipline "Latin language" introduces you to the basics of the Latin language grammar, which is necessary for you in future professional communication. During the course of mastering the discipline, you will also acquire the skill of writing a recipe in Latin, get acquainted with the rules of its compilation and the linguistic features of prescription writing.

Tasks of the discipline:

To form knowledge in the field of:

- Latin phonetics, vocabulary and grammar with the focus on professional abilities and skills;
- understanding and using the Latin-language terminological units and term elements from pharmaceutical, medical, biological, chemical and other scientific terminology in professional activity;
- the basic principles of reading and writing recipes in Latin;
- development of the student's professional self-awareness, his ability to use the acquired knowledge in the practical and research activity of the future specialist.

Course topics:

Calendar plan of practical classes

Module 1. Latin grammar. Structure of pharmaceutical terms

Topic 1.1. The alphabet. The rules of reading. Pronunciation of sounds and letter combinations.

Topic 1.2. The stress (accentuation). The length and brevity of the vowels. The rules of stress. Reading training.

Topic 1.3. Noun: general information. The dictionary form of the noun. Gender, number, cases and declensions of nouns.

Topic 1.4. Nouns of 1, 2, 4, 5 declensions. Uncoordinated definition. Singular and plural nouns of 1, 2, 4 and 5 declensions.

Topic 1.5. Uncoordinated definition (continuation). Training in composing phrases with uncoordinated definitions.

Topic 1.6. Adjective. Adjectives of the 1st group. The dictionary form of adjectives. Declension of adjectives of group 1. Coordinated definition.

Topic 1.7. Coordinated definition (continuation). Training in composing phrases with coordinated definitions and their declension.

Topic 1.8. Nouns of the 3rd declension. Three types of the 3rd declension, exceptions of the 3rd declension. Determining of stem and subtype.

Topic 1.9. Adjectives of the 2nd group (three, two and one endings subtypes), features of their declension. Coordination with nouns.

Topic 1.10. Degrees of comparison of adjectives. Declension of adjectives in comparative and superlative degrees. Coordination with nouns. Suppletive degrees of comparison.

Topic 1.11. Coordinated and uncoordinated definitions: generalization. Declension of nouns and adjectives of the 1st and 2nd groups in the singular and plural: generalization and repetition. Training in composing pharmaceutical terms with different kinds of definition.

Topic 1.12. Prepositions in Latin. Prepositions used with Acc. Prepositions used with Abl. Prescription expressions with prepositions.

Topic 1.13. Preparation for the control (module work No. 1.).

Topic 1.14. Module work No. 1

Module 2. Recipe

Topic 2.1. Verb: general information. The verb in the recipe. Grammatical categories, conjugation, verb base. The infinitive. The indicative, imperative and subjunctive mood. The present tense of the active and passive voices.
Topic 2.2. Recipe: grammatical structure. Prescription. Grammatical features of the recipe line.
Topic 2.3. Abbreviations in recipes. Abbreviations in the field of nouns and adjectives. Abbreviations in the field of prescription formulations.
Topic 2.4. Practical reading (translation) of recipes. Translation of recipes from Latin into Russian (in full and abbreviated form).
Topic 2.5. Preparation for the control (module work No.2).
Topic 2.6. Module work No. 2
Module 3. Pharmaceutical terminology in Latin
Topic 3.1. Clinical term elements in pharmaceutical terminology. Affixes and root morphemes that formalize clinical terms. Methods of morphemic word formation. Prefixes and suffixes of Greek-Latin origin. Greek term elements for the formation of clinical terms. The word structure.
Topic 3.2. – 3.7. The main Greek-Latin term elements denoting organs and systems, body parts, various physical characteristics (temperature, color, volume, space, etc.), functional states and processes, pathological conditions and processes.
Topic 3.8. Latin botanical terminology of pharmacy. The history of botanical terminology. The structure of the botanical term, the generic name, the specific epithet. Names of botanical families, names of plants in the nomenclature of medicines.
Topic 3.9-3.11. Pharmaceutical term elements. Pharmaceutical term elements indicating the therapeutic effect of medicines. Antimicrobial and antiparasitic drugs. Hormonal drugs. Enzyme preparations and vitamins. Medicines for the cardiovascular system and central nervous system. Analgesic, antipyretic and anti-inflammatory drugs. Medicines for the treatment of gastrointestinal diseases. Bronchopulmonary medicines. X-ray contrast medications. Chemical information and information contained in the pharmaceutical term. Pharmaceutical term elements indicating other characteristics of medicines (color, number, duration and intensity of action, etc.)
Topic 3.12. Nomenclature of medicines. Language features. Names of medicines. Names of medicinal products from medicinal raw materials, trivial names of medicinal substances. INN, patented names of medicinal products. Trade names of medicines. Pharmacopoeia chemical nomenclature.
Topic 3.13. The nomenclature of medicines. Features of word formation. Borrowed names of medicines. The influence of new European languages in the field of drug nomination. Morphemic and semantic way of word production of medicines.
Topic 3.14. Preparation for the control (module work No. 3)
Topic 3.15. Module work No. 3
Topic 3.16. Training on final testing.
Text books and required supplies:
1. Arnaudov, G. Terminologia medica polyglotta. Sofia : Medicina i fizkultura, 1979. 943 c.
2. General prescription: a handbook / A.V. Volchek et al. Minsk: BSMU, 2015. 32 p.
3. Kondratiev D. Latin and Fundamentals of Medical Terminology for Medical Students / D.K. Kondratiev et al. Grodno: GrSMU, 2005. 250 c.
4. Zysik A.Z. The pharmaceutical Latin. Minsk: BSMU, 2016.

5. Latin Language for Foreign Students (Specialty: Pharmacy). URL: https://e.kazangmu.ru/course/view.php?id=1735

Evaluation and grading:
Monitoring progress is carried by the end of each module (written works).

Routine performance assessment (homework, class work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation is considered to be a student academic debt. In order to rework the debt, the student can do the rework using e-learning or distance technologies or in other ways determined by the teacher. Many academic debts, so as absence from practical classes are leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (written work). Grading: 0–59 points – noncredit; 60–100 points – credit. Student is given not more than 3 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of an online test. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is built up from class attendance, module work results (midterm assessment results).

Classroom rules:
1. Attendance of classes in any format is mandatory. If you were not in class for any reason, you must answer to the teacher the material that was assigned for that day.
2. Please do not tell us your diagnoses and medical problems. You can contact the dean's office with this. In any case, we will note your absence.
3. The task of the teachers of the department is to teach you and control your knowledge. All issues that are not directly related to our discipline must be resolved with your tutor and the dean's office.
4. Write all messages to the messenger group. Otherwise, they just get lost in our phones. Each of us has more than 300 students studying at the same time, we are not able to communicate with each individually.
5. The teacher responds to messages only during business hours. Have respect for the teacher's free time and days off.

Sample of module work No. 1.
1. Give the dictionary form of following words:
alcohol, collection (tea), powder, acid, hawthorn, essential, white, cold, equal, common
2. Translate and decline:
simple syrup, cut rhizome, intestinal tablet
3. Translate phrases:

isotonic solutions, hawthorn fruit tincture, senna complex infusion, emulsions for external use, plantain leaves, thick extract in capsules

EVALUATION OF THE MODULE ANSWER

Task 1: 1 point for each correct answer – total 10 points maximal.

Task 2: 10 points for each correct phrase (0.5 point for each correct form in a phrase) – total 30 points maximal

Task 3: 9 points for each correctly translated phrase – total 60 points maximal.

_____

Total: 100 points

Sample of module work No. 2

1) *Write prescriptions in a full form, translate into English*:

Rp.: Sol. Chlorpromazini pro inject. 2,5% - 2 ml

D.t.d. N 6 in amp.

Rp.: Tolperisoni 150 mg

D.t.d. N 30 in tab.prolong.

2) *Fill in endings*:

Recipe: Suppositori__ vaginal__ cum Synthomycin__ 0,25. D.t.d. N 10.

Recipe: "Agiolax" granul_____ 250,0.

Recipe: Chamomill___ flor___ infus___ ex 20,0 – 200ml

Recipe: Hydrogenii peroxyd___ soltion___ dilut___ 50 ml

3) *Translate into Latin*:

powders for internal use; mix it, let it be a ball; give out such doses in amount 10 in ampoules

EVALUATION OF THE MODULE ANSWER

Task 1: 5 points for a correct full form, 5 points for a translation – total 20 points maximal

Task 2: 5 points for each correct ending – total 50 points maximal

Task 3: 10 points for each correct translation – total 30 points maximal

_____

Total: 100 points

Sample of module work No. 3

1. Explain the meaning of the following clinical terms:

E.g.: *allergia* – 'other reactivity' (you shouldn't just write *allergy;* such an answer does not count!)

acholia, adenectomia, andrologia, cyanuria, dysgalactia, glykaemia, hyperhidrosis, hysteroscopy, kinesitherapia, polyarthritis, pyorrhoea, splanchnoptosis, synergia, toxicologus

2. Highlight significant term elements (their number is indicated in brackets) and explain their meaning:

E.g.: *Aethyotrastum* (2) – *aeth-* - presence of an ethyl group, *trast-* - diagnostic, contrast preparation

Solasulfonum (1), Elaprase (1), Androcur depot (2), Myfungar (1), Forlax (1), Cholemax (1), Bromisoval (2), Fluimucil (1).

EVALUATION OF THE MODULE ANSWER
Task 1: 5 points for each correct explanation – total 70 points maximal
Task 2: 3 points for each correct explanation – total 30 points maximal

_____
Total: 100 points

Exam and its evaluation
Examination work is proceeded in form of an online-test by means of educational platform and consists of 50 questions of different kind (multiple choice, cloze, true/false) from all three modules (25 questions from the module 1, 15 questions from the module 2, 10 questions from the module 3), e.g.:
The ending –us should be used in the phrase:
а) Sulfur praecipitat__
б) cataplasma calid__
в) radix concis__
г) Carbo activat__ (+)

Write in Latin: ointment
[unguentum]

"Cloforex" belongs to the group of hormonal medicines
True / False (+)
etc.
Each correct answer brings 2 points (100 points are maximal possible). The evaluation is proceeded automatically according to the number of correct answers. Grading: 0–69 – "poor" (not accepted), 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

CHEMISTRY OF BIOGENIC ELEMENTS

Teachers: DSc Liliya Nikitina, Ilmir Gilfanov
Building, Department, classroom: NUK, Department of General and Organic Chemistry, 625, 654
Contact details:
DSc Liliya Nikitina:
Telephone number: 89033075070
E-mail address: nikitl@mail.ru
Office and working hours: 633, 9 am – 5 pm
Ilmir Gilfanov:
Telephone number: 89173970834
E-mail address: ilmir.gilfanov@gmail.com
Office and working hours: 635, 9 am – 5 pm

Total hours — 108 hours:
Lectures 16 hours;
Practical classes 45 hours;
Independent work (self-study) 11 hours;
Control 36 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=3065).

Course objectives:
The goals of mastering the chemistry of biogenic elements are to provide students with systematic knowledges including the structure and reactivity of inorganic compounds of biogenic elements, the ability to perform calculations of the parameters of physicochemical processes, understanding of the mechanisms of interactions of substances occurring in the human body at the cellular and molecular levels, and to acquire professional pharmaceutical qualities (hereinafter — discipline).

Tasks of the discipline are to:
develop knowledges in the fundamentals of general chemistry, the structure and reactivity of compounds of biogenic elements, including those used in medicine and pharmacy;
introduce students with the principles of organization of a chemical laboratory;
acquire skills in performing work in a chemical laboratory using special equipment;
develop understanding on the physicochemical aspects of key biochemical processes and various types of homeostasis in the organism.

Course topics:
Calendar plan of lectures
Periodic table of elements. Electronic structure of atoms, valence, electronegativity, unpaired electron pair, electrophiles and nucleophiles. Chemical bond: types and mechanisms of formation of chemical bond.
Chemistry of biogenic and trace s-elements and their compounds: lithium, sodium, potassium, rubidium, cesium, magnesium, calcium, beryllium, strontium, barium. Biological role and application in medicine and pharmacy of s-elements and their compounds.

Chemistry of biogenic and trace p-elements and their compounds: boron, aluminum, thallium, carbon, silicon, germanium, tin, lead. Biological role and application in medicine and pharmacy of p-elements and their compounds.
Chemistry of biogenic and trace p-elements and their compounds: nitrogen, phosphorus, arsenic, antimony, bismuth. Biological role and application in medicine and pharmacy of p-elements and their compounds.
Chemistry of biogenic p-elements and their compounds: oxygen, sulfur, selenium. Biological role and application in medicine and pharmacy of biogenic p-elements and their compounds.
Chemistry of biogenic p-elements and their compounds: hydrogen, halogens. Biological role and application in medicine and pharmacy of biogenic p-elements and their compounds.
Chemistry of biogenic and trace d-elements and their compounds: chromium, manganese, molybdenum, iron, titanium, vanadium, tungsten. Biological role and application in medicine and pharmacy of d-elements and their compounds.
Chemistry of biogenic and trace d-elements and their compounds: cobalt, nickel, copper, zinc, cadmium, mercury, silver, gold, platinum, palladium, cerium. Biological role and application in medicine and pharmacy of d-elements and their compounds.

Calendar plan of laboratory classes
Introduction to the chemistry of biogenic elements: goals and tasks of mastering the discipline. Briefing on safety rules in a chemical laboratory. Rules for drawing up laboratory work protocols. Chemical and laboratory glassware.
Methods of expression of the concentration of solutions. Determining the concentration of solutions by volumetric (titrimetric) methods. Equivalence law. Solubility of compounds: solubility product and ionic product. Preforming the laboratory work "Preparation of solutions of a given concentration".
Solutions and their properties: diffusion. Strong and weak electrolytes. Degree of dissociation. Theory of acids and bases. Ionic product of water. Ionic strength of solution and ion activity. Indicators. Preforming the laboratory work "Synthesis of fluorescein and its diffusion in water".
Water: hydrogen bonds and hydration. Hydrolysis. Hydrolysis of cation, anion, and complete. Multistage hydrolysis. Hydrolysis constant. Buffer solutions. Preforming the laboratory work "Electrolyte solutions. Hydrolysis of salts".
Complex compounds: structure, classification, isomerism, primary and secondary decomposition. Application of complex compounds in analytical chemistry: complexometry. Preforming of the laboratory work "Complexometric determination of water hardness".
Redox reactions: redox couple and redox potential, direction of redox reaction, influence of the environment on the redox potential. Oxydimetry. Preforming of the laboratory work "Permangometric determination of hydrogen peroxide content in solution".
Module on topics 1-6.
Chemistry of biogenic s-elements and their compounds: lithium, sodium, potassium, magnesium, calcium. Biological role and application in medicine and pharmacy of biogenic s-elements and their compounds. Preforming of laboratory work "Chemistry of lithium, sodium, potassium, magnesium, calcium, strontium, barium and their compounds".
Content of the independent work of the student: Chemistry of trace s-elements and their compounds: rubidium, cesium, beryllium, strontium, barium. Biological role and application in medicine and pharmacy of s-elements and their compounds.

Chemistry of biogenic p-elements and their compounds: carbon, silicon. Biological role and application in medicine and pharmacy of biogenic p-elements and their compounds. Preforming of laboratory work "Chemistry of boron, aluminum, carbon, silicon, lead and their compounds".
Content of the independent work of the student: Chemistry of trace p-elements and their compounds: boron, aluminum, thallium, germanium, tin, lead. Biological role and application in medicine and pharmacy of p-elements and their compounds.
Chemistry of biogenic p-elements and their compounds: nitrogen, phosphorus. Biological role and application in medicine and pharmacy of biogenic p-elements and their compounds. Preforming of laboratory work "Chemistry of nitrogen, phosphorus and their compounds".
Content of the independent work of the student: Chemistry of trace d-elements and their compounds: titanium, vanadium, tungsten. Biological role and application in medicine and pharmacy of d-elements and their compounds.
Chemistry of biogenic p-elements and their compounds: oxygen, sulfur, selenium. Biological role and application in medicine and pharmacy of biogenic p-elements and their compounds. Preforming of laboratory work "Chemistry of oxygen, sulfur and their compounds".
Chemistry of biogenic p-elements and their compounds: hydrogen, halogens. Biological role and application in medicine and pharmacy of biogenic p-elements and their compounds. Preforming of laboratory work "Chemistry of hydrogen, halogens and their compounds".
Chemistry of biogenic d-elements and their compounds: chromium, manganese, molybdenum, iron. Biological role and application in medicine and pharmacy of biogenic d-elements and their compounds. Preforming of laboratory work "Chemistry of chromium, manganese, molybdenum, iron and their compounds".
Content of the independent work of the student: Chemistry of trace d-elements and their compounds: titanium, vanadium, tungsten. Biological role and application in medicine and pharmacy of d-elements and their compounds.
Chemistry of biogenic d-elements and their compounds: cobalt, nickel, copper, zinc. Biological role and application in medicine and pharmacy of biogenic d-elements and their compounds. Preforming of laboratory work "Chemistry of cobalt, nickel, copper, zinc, silver, cadmium and their compounds".
Content of the independent work of the student: Chemistry of trace d-elements and their compounds: cadmium, mercury, silver, gold, platinum, palladium, cerium. Biological role and application in medicine and pharmacy of d-elements and their compounds.
Module on topics 8-14.

Text books and required supplies:

1. L.E. Nikitina, E.Y. Mikrukova, L.A. Anufrieva. An introduction to general chemistry / Kazan: KSMU, 2008. — 78 p.
2. E.Y. Mikrukova, L.E. Nikitina. An introduction to general chemistry / Kazan: KSMU, 2009. — 59 p
3. L.E. Nikitina, I.B. Sitdikov, G.G. Khisameev, S.I. Galeeva, K.A. Sagdeev, E.Y, Mikrukova, A.K. Bikmuhametova, I.V. Karamysheva. Manual on laboratory-practical classes on general chemistry / Kazan: KSMU, 2006. — 68 p.
4. I.B. Sitdikov, I.A. Ryazanov, S.I. Galeeva, I.A. Abdullin, L.E. Nikitina, E.Y. Mikrukova, A.K. Bikmuhametova, I.V. Karamysheva. Manual on quantitative analysis / Kazan: KSMU, 2006. — 52 p.

5. N. Lezhava, O. Gabrichidze. An introduction to medical chemistry / Tbilisi, 2006. — 292 p.
6. Bruce M. Mahan, Rollie J. Myers. University Chemistry. Fourth edition: Addison Wesley Longman. 1998. — 1076 p.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10-point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt, the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is built up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful;
- Be careful with equipment;
- Be disciplined;
- Be prepared for the classes;
- Be involved, do not hesitate to ask questions;
- Look professional: you have to wear clean white coat and change shoes;
- Eating is allowed only during brakes;
- Using phone is allowed only during brakes;
- Maintain the safety rules in chemical laboratory and during performing laboratory works.

Example of Module No. 1. Elements of General Chemistry

1. In which sequence are the chemical elements arranged in order of decreasing atomic radius?
A) Rb, K, Na, Li; B) Be, Mg, Ca, Sr; C) B, Al, Ge, C; D) C, Si, Ge, Sn.
2. The mass fraction of the solute indicates:
A) the mass of solute in 100 g of solution; B) the mass of solute in 100 ml of solution;
C) the mass equivalent of the solute in 100 g of solution; D) the mass equivalent of the solute in 100 ml of solution.

3. How much (g) Na_2CO_3 is required to prepare 1.5 liters of a solution with an equivalent molarity of 0.15 mol/l? The solution is intended for a reaction that goes to completion.
A) 11.925; B) 23.85; C) 30.422; D) 10.02.
4. Among the listed substances, identify strong electrolytes:
A) Na_2SiO_3; B) $Mg(OH)_2$; C) NH_3; D) CaF_2
5. An ammonia buffer consists of ammonia and:
A) ammonium chloride; B) ammonium acetate; C) lead acetate; D) ammonium persulfate.
Example of Module No. 2. Chemistry of Biogenic Elements
1. The antagonist of potassium is:
A) Ba; B) Cl; C) Sr; D) Ca.
2. The main component of bone tissue is:
A) Ca; B) Ba; C) Sr; D) S.
3. Ca in a bone tissue can be replaced by:
A) Ba; B) Sr; C) Na; D) Se.
4. Indicate the alkali metal:
A) Na; B) Ca; C) S; D) Ge.
5. It was found the duration of insulin effect increased after the injection of drugs containing:
A) Ni; B) Na; C) Ba; D) Ge.

EVALUATION OF THE MODULE ANSWER

The question card of the module consists of 50 test questions for either elements of general chemistry or chemistry of biogenic elements. Each question on module is evaluated by 1 point, and there is only one correct answer for each one. In case of wrong answer student receives 0 point.
Total for one question: 1 point. Total: 1 x 50 = 50 points.

Example of Exam Ticket

1. The geometry corresponding to the sp^3 hybridization of the central atom is:
A) linear; B) trigonal bipyramidal; C) tetrahedral; D) square planar.
2. A solution is called concentrated if it has:
A) a high concentration of solute; B) a low concentration of solute; C) a concentration of solute equal to its solubility; D) a concentration of solute greater than its solubility.
3. A NaCl solution with a mass fraction of 0.85% (ρ = 1.005 g/ml), known as saline solution, is used for intravenous infusions. Determine the molarity of this solution.
A) 0.146; B) 0.1; C) 0.2; D) 0.246.
4. A solution of $CaCl_2$ with a molarity of 0.025 mol/l is used to determine the recalcification time of blood plasma. How many grams of $CaCl_2$ are required to prepare 250 ml of this solution?
A) 0.6938; B) 1.3876; C) 0.2458; D) 0.8612.
5. The pH value of absolutely pure water at 298K is:
A) 0; B) 1; C) 7; D) 14.
6. Calculate the pH of a 0.01 N ammonia solution if α = 0.042.
A) 10.62; B) 9.74; C) 15.62; D) 7.9.
7. To suppress hydrolysis, solutions should be:

A) acidified or alkalized; B) sealed in ampoules; C) dehydrated to dry residue; D) stored diluted at low temperatures.
8. In the flame test sodium ions color flame into
A) yellow; B) green; C) blue; D) black.
9. Nitrate ions in the solution can be detected by:
A) sulfuric acid; B) diphenylamine; C) flame test; D) sodium hydroxide.
10. The detection of lead ions in the solution is based on their reaction with:
A) potassium iodide; B) alkali; C) sulfuric acid; D) magnesium sulfate.

EVALUATION OF THE EXAM ANSWER

The question card of the exam consists of 50 test questions including topics of elements of general chemistry (20) and chemistry of biogenic elements (30). Each question on exam is evaluated by 2 points, and there is only one correct answer for each one. In case of wrong answer student receives 0 point.
Total for one question: 2 points. Total: 2 x 50 = 100 points.

HISTORY OF RUSSIA

Teachers: assistant Timur Khasanov, assistant Aysylu Shakirova
Building, Department, classroom # NUK, Department of history, philosophy and sociology, 331, 329
Contact details:
Telephone number: 89961243861 (assistant Aysylu Shakirova)
E-mail address: nasibullina-aysylu@mail.ru
Office and working hours: 348 (9-17)
Class hours:
Total hours — 72:
- Lectures 10 hours;
- Practical classes 26 hours;
- Independent work 36 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (http://www.kgmu.kcn.ru:40404/moodle/login/ index.php).

Course objectives: The purpose of mastering the discipline

The goals of mastering the history of Russia discipline are formation a comprehensive understanding of the cultural and historical uniqueness of Russia and its place in world and European civilization; to form systematized knowledge about the basic patterns and features of the world historical process with an emphasis on studying the history of Russia; introduction to the range of historical problems, development of skills for obtaining analysis and generalization of historical information.

Tasks of the discipline:

To form knowledge in the field of:

- understanding of citizenship and patriotism as devotion to one's Fatherland, the desire to serve its interests through one's actions, incl. protecting the interests of Russia;
- knowledge of the driving forces and patterns of the historical process; the place of man in the historical process, the political organization of society;
- education of morality, ethics, tolerance;
- understanding the diversity of cultures and civilizations in their interaction, the multivariate nature of the historical process;
- understanding the place and role of the graduate's field of activity in social development, the relationship with other social institutions;
- the ability to work with diverse sources, the ability to effectively search for information and criticize sources;
- skills of historical analytics: the ability, based on historical analysis and a problem-based approach, to transform information into knowledge, to comprehend processes, events and phenomena in Russia and the world community in their dynamics and interrelationships, guided by the principles of scientific objectivity and historicism;
- ability to think logically and conduct scientific discussions;
- creative thinking, independent judgment, interest in domestic and world cultural and scientific heritage, its preservation and enhancement.

Course topics:

Calendar plan of lectures

1. History as a science. From the formation of the ancient Russian state to feudal fragmentation.
2. The rise of Moscow and the formation of the Russian state in the 13th – 16th centuries.
3. From the Grand Duchy to the Muscovite Kingdom. Russia in the late 16th – 17th centuries.
4. Russia in the 18th and 19th centuries.
5. Revolutionary upheavals and the USSR in the 20th century. Russia and the world at the turn of the century.

Calendar plan of practical classes

1. Eastern Slavs in ancient times. Old Russian state 9th – 13th centuries. Socio-political changes in Russian lands in the 12th – 13th centuries.
2. Formation of the Russian centralized state in the 14th – 15th centuries.
3. Russia and the world in the 16th – 17th centuries.
4. Features of the modernization of Russia in the 18th century.

5. Russia in the 18th century: from the era of palace coups to the Enlightened absolutism of Catherine II.
6. Russian Empire in the first half of the 19th century. Attempts to resolve the peasant question.
7. Russia during the period of reforms and the beginning of industrialization in the second half of the 19th century.
8. Russia in the conditions of a national crisis and the First World War.
9. Formation of the Soviet state in the 1920s – 1930s of the 20th centuries.
10. The Soviet Union during the Second World War and the Great Patriotic War. Post-war development of the USSR.
11. The Thaw or the Search for Alternative Paths of Development in the History of the Soviet State.
12. Soviet Union in 1965 – 1991.
13. Russia at the turn of the century. Russia and the world in the 21st century.

Text books and required supplies:

1. History of Russia IX- beginning of the 20th century / Maksimenko E.P. M.: MISiS, 2016.https://www.studentlibrary.ru/book/ISBN9785906846198.html
2. Radugin A.A. History of Russia (2. History of Russia: from ancient times to the present day: textbook / Derevyanko A.P., Shabelnikova N.A., Usov A.V. M.: Prospekt, 2016.
1. https://www.studentlibrary.ru/book/ISBN9785392192144.html
2. Historiography of Russian history: textbook / ed. A. A. Chernobaeva. 2nd ed., revised. and additional M.: Yurayt, 2014.
3. Bushuev S.V. History of the Russian state: historical and bibliographical essays / S.V. Bushuev, G.E. Mironov. M.: Book Chamber, 1991.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test /abstracts/reports).

Routine performance assessment (homework, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of module No.1
Annotation
Write an annotation based on the historical material "Formation of the Russian state at the 9th century".
Total: 10 points

Example of module No.2
Analysis of a problem situation
Having studied the lecture materials and the recommended educational literature, you should prepare answers to the following questions:
1. What were the causes of historical events?
2. What role and what influence did the participants in these events have?
3. Was it possible to prevent negative events?

EVALUATION OF THE MODULE ANSWER

The question card of the module consists of 3 tasks.
Questions 1 - 3 on history of Russia are evaluated by 33 points.
* The teacher has the right to remove from 1 to 3 points for incorrect writing.
Total: 3 x 33 = 100/10 points

HISTORY OF PHARMACY

Teachers: PhD Regina Ivanova
Building, Department, classroom # NUK, Department of Biomedical ethics, medical law and history of medicine, 322, 319, 317, 324

Contact details:
Telephone number: 89047628064 (PhD Regina Ivanova)
E-mail address: R.Ivanova@kazangmu.ru MuseumKGMU@yandex.ru
Office and working hours: 332 (9–17)
Class hours:
Total 18 h:
Lectures - 8 hours;
Practical classes – 10 hours;
Independent work – 18 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Practical training is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The work involves active participation of students in problem discussion. It requires preliminary preparation by the student and it is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (http://www.kgmu.kcn.ru:40404/moodle/login/ index.php).

Course objectives: The purpose of mastering the discipline are formation of systematic knowledge and skills of formulating
- the main stages and patterns of development of the world historical process in pharmacy;
- the main stages and patterns of development of the Russian history;
- names of outstanding figures in medicine and health care, outstanding medical discoveries, the impact of humanistic ideas on medicine and pharmacy;
- the most important milestones in the history of world medicine and pharmacy, the place and role of each crucial achievement in the history of mankind and in the modern world;
- general patterns of the world-historical process of formation and development of pharmacy and medicine in various countries of the world from ancient times to our time;
- socio-cultural traditions of various social groups, ethnic groups, confessions, including world religions, philosophical and ethical teachings necessary for the study of other academic disciplines and the acquisition of professional medical qualities.

Tasks of the discipline:
To form knowledge in the field of:
- analyzing the features of social interaction, taking into account historical, national, cultural and religious
characteristics;
- to express professional information competently and in an accessible way in the process of intercultural interaction;
- analyze historical events and processes, logically correctly and clearly build oral and written speech;

- take into account in social and professional communication the socio-cultural traditions of various social groups, ethnic groups, confessions, including world religions, philosophical and ethical teachings;
- analyze and evaluate historical information, formulate reasoned judgments regarding the history of medicine, justify one's own civic position, conduct a dialogue

Course topics:

Calendar plan of lectures

Lecture №1. Introduction to the History, history of pharmacy course. History of pharmacy as a science. Classification of historical sources;
Lecture №2. Russian history in IX–XVII centuries;
Lecture №3. Russian history in XVIII–XX centuries;
Lecture №4. Russian cultural history in IX–XX centuries;
Lecture №5. Medicine and pharmacy in Ancient World; Medicine and pharmacy in the Middle Ages and Renaissance (V – XVII centuries);
Lecture №6. European medicine and pharmacy in New Age (XVIII – XIX centuries);
Lecture №7. World medicine and pharmacy in XX century;
Lecture №8. Kazan medical history;
History of pharmacy and pharmacy.

Calendar plan of practical trainings

Class 1. Seminar № 1. History as a science;
Class 2. Seminar № 2. History of as pharmacy a science. Historical sources. Medicine and pharmacy in primitive society;
Class 3. Seminar № 3. Ancient and Medieval Russian medicine and pharmacy;
Class 4. Seminar № 4. Medicine and pharmacy in Ancient East (Mesopotamia, Egypt);
Class 5 Seminar № 5. Medicine and pharmacy in Ancient East (India, China);
Class 6. Module №1 on topics 1–5;
Class 7. Seminar № 6. Medicine and pharmacy in the Byzantine Empire;
Class 8. Seminar № 7. History of Ancient Kievan Rus' and Medieval Russia;
Class 9. Seminar № 8. History of Russia in XVIII century;
Class 10. Seminar № 9. History of Russia in XIX century;
Class 11. Seminar № 10. History of Tatarstan and Kazan;
Class 12. Module №2 on topics 6–10;
Class 13. Seminar № 11. Medieval Islamic medicine;
Class 14. Seminar № 12. Formation of Hygiene and Public health in XVI–XIX centuries;
Class 15. Seminar № 13. Military medicine in XX century;
Class 16. Module №3 on topics 11–13;
Class 17. Excursion to the Museum of KSMU' history;
Class 18. Final test.

Text books and required supplies:

1. Kaiser D. H. Maureen Perrie, ed. The Cambridge History of Russia. Volume I: From Early Rus' to 1689. Cambridge: Cambridge University Press, 2006, 777 pp.;

2. Morrissey S. The Cambridge History of Russia. Vol. 2, Imperial Russia, 1689–1917. Ed. Dominic Lieven. Cambridge, Eng.: University of Cambridge Press, 2006. 765 pp.;
3. Nathans B. The Cambridge History of Russia. Volume 3, The Twentieth Century. Edited by Ronald Grigor Suny. Cambridge: Cambridge University Press, 2007. 842 pp.;
4. The History of the Tatars, Volumes 1–7, Kazan, 2017;
5. Lisicyn YU. P. Istoriya mediciny: uchebnik Moskva: Izdatel'skaya gruppa "GEOTARMedia", 2015
6. Kashnikova K. V. Istoriya mediciny i farmacii: Uchebnoe posobie Moskva: Eksmo, 2010, Electronic resource
7. Lisicyn Yu. P. Istoriya mediciny: uchebnik Moskva: Izdatel'skaya gruppa \"GEOTAR-Media\", 2015
8. Bachilo E. V. Istoriya mediciny i farmacii: Uchebnoe posobie Moskva: Eksmo, 2010, Electronic resource
9. Jackson M. The Oxford Handbook of the History of Medicine New York: Oxford University Press, 2013
10. Magner L. N., Kim O. J. A History of Medicine Boca Raton [et al.]: CRC Press Yaylor & Francis Group, 2018
11. Tyurina I. A., Kovalenko E. I. Istoriya mediciny v Rossii: uchebno-metodicheskoe posobie Surgut: Izdatel'skij centr SurGU, 2022, Electronic resource
12. Sc.D., Kalinin A. G., Postoev V. A., Cand.Sc., History of Medicine and Public Health: training manual Arhangel'sk: СГМУ, 2021, Electronic resource
13. Sonnedecker G. (ed.), Kremers and Urdang's History of Pharmacy (4th ed.), Philadelphia, PA: J.B. Lippincott Company, 1976.
14. Higby GJ. From compounding to caring: An abridged history of American pharmacy, in Knowlton CH, Penna, RP (eds.) Pharmaceutical Care. New York, NY: Chapman & Hall, 1996.
15. Higby GJ. Evolution of pharmacy, in Troy DB (ed.) Remington: The Science and Practice of Pharmacy (21st ed.), Philadelphia, PA: Lippincott Williams & Wilkins, 2006.
16. Posey LM. Development of pharmacy in history as a healing profession, in Posey LM (ed.) Pharmacy: An introduction to the profession, Washington, DC: American Pharmacists Association, 2003.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/ abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during breaks
- Using phone is allowed only during breaks

Example of module No. 1.

1. Answer the question "History of pharmacy as a science"

Answer: The History of pharmacy is the important part of Medical humanities consists of the humanities (literature, philosophy, ethics, history and religion), social science (anthropology, cultural studies, psychology, sociology), and the arts (literature, theater, film, and visual arts) and their application to medical education and practice. The History of pharmacy shows how societies have changed in their approach to illness and disease from ancient times to the present; studies the patterns of development and the history of treatment, medical knowledge and medical activity of peoples around the world throughout the history, in close connection with the philosophy, science, culture, psychology. The World History of pharmacy introduces students to the world of their future profession, increases the level of general and professional culture, and brings a sense of professional medical ethics. The History of pharmacy helps to understand global problems and challenges in the field of medicine and public health; helps to recognize our own responsibility for the future of our planet and helps to find ways and methods of solving these problems and challenges.

2. Answer the question "Prehistoric forms of medicine".

Answer: Prehistoric forms of medicine are now known as traditional medicine and folk medicine, though they do not fall within the modern definition of "medicine" which is based in medical science. Traditional medicine (also known as indigenous or folk medicine) comprises medical aspects of traditional knowledge that developed over generations within various societies before the era of modern medicine. The World Health Organization defines traditional

medicine as "the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness". Traditional medicine is contrasted with scientific medicine.

3. Answer the question “Primary historical sources”
Answer: Primary historical sources on the history of primitive era and prehistoric healing study. The development of therapeutic human activities in different periods of history is not the same and, as a rule, is in inverse proportion to the antiquity. The reconstruction of the primitive society history is the most difficult: this era has not left any written records. Interpretation of archaeological and ethnographic data has completely objective difficulties and requires constant revision of our concepts in relation to new scientific discoveries. Primary historical source (also called an original source or evidence) is a first hand-created evidence (artifact) of history made at the event time by someone who was present there.

EXAMPLE OF MODULE № 3 QUESTIONS:
- Al-Razi.
- Pharmacy in Medieval Islamic medicine
- Ali ibn-Sina. “The Canon of Medicine”
- Medieval Islamic hospitals. Features of hospitals
- William Petty. John Graunt
- Paracelsus. Georgius Agricola
- Bernardino Ramazzini. Edward Jenner
- Max Joseph Pettenkofer. Robert Koch
- Terms «military medicine», “Mental disorder”, “Shell shock”
- Development of Pharmacy in XIX – early XX centuries
- Public health and volunteer organizations
- World War I Public Health effects
- Marie Curie and Helen MacMurchy medical contributions.
- Development of Psychiatry in XIX – early XX centuries.
- Terms “Combat stress reaction”, “posttraumatic stress disorder”
- Alexander Fleming

EVALUATION OF THE MODULE ANSWER
The question card of the module consists of 3 questions.
Less than 70 points = No any question is answered correctly. Module isn’t passed, student has to re-pass it again;
70–75 points = 1 question is answered correctly and completely; or 2-3 questions are answered correctly but not completely;
80-85 points = 2 questions are answered correctly and completely; or 3 questions are answered correctly but not completely;
90-95 points =3 questions are answered correctly and completely;
100 points = perfect answer for all 3 questions, given with all the details
* The teacher has the right to remove from 5 to 15 points for incorrect or incomplete writing of names, terms, and dates.

Total for three questions: 100 points

PHILOSOPHY

Teachers: Dr.Sc. Alexei Gurianov, Dr.Sc Svetlana Nagumanova, PhD Sarbinaz Gayazova
Building, Department, classroom # NUK, Department of History, Philosophy, Sociology, 350, 348
Contact details:
Telephone number: 89046724398 (Dr.Sc. Alexei Gurianov)
E-mail address: alexeigurianov@rambler.ru
Office and working hours: 348 (9-17)

Total hours — 108:
- Lectures 14 hours;
- Practical classes 36 hours;
- Independent work 22 hours;
- Control 36 hours

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=1175).
Course objectives:
The purpose of mastering the discipline
The purpose of mastering the Philosophy discipline is formation of humanistic and scientific worldview, systematic and critical thinking, active and responsible behavior by means of a range of philosophical ideas and approaches developed throughout the history of philosophy.

Tasks of the discipline:
Contribute to formation of comprehensive systematic view at the world and the man as its integral part;
Familiarize with the diversity of outlooks, philosophical schools and doctrines;
Develop the ability of critical analysis of approaches to worldview problems;
Develop the ability to formulate precisely, argue and present one's own views in a logical and consistent manner.

Course topics:
Calendar plan of lectures
Philosophy - concept, genesis, subject matter, structure
Philosophy - features, functions, stages of development, benefits

Early Greek Philosophers (pre-socratics)
Hellenistic and Christian philosophy
Modern Metaphysics
18-19th Century Philosophy
Ancient and Modern Ethics

Calendar plan of practical classes

1. Historical interpretations of philosophy, main subject-areas are given together with a consideration of the dialogue that raises main points about philosophy, reasons of philosophizing and modern problems discussed with the help of philosophy.
2. Basic branches of philosophy, subdivision of philosophy, the place philosophy occupies among other types of historical worldviews. Origin of philosophy and the relationship between philosophy and science. Basic philosophical questions.
3. Metaphysics as the study of the nature of being; historical interpretations and main points about metaphysics, the derivation of the word. Comparison and contrast of the metaphysics of the three Milesians.
4. Comparison and contrast of the metaphysics of Heraclitus and Parmenides. Parmenides's way of thinking. Comparison and contrast of the metaphysics of the atomists, Anaxagoras, Empedocles.
5. Plato's metaphysics incorporates ideas from some of the other, earlier philosophers mentioned before. Identification of as many of those philosophers and ideas as possible. Explanation of two statements "The behavior of atoms is governed entirely by physical law." "Humans have free will." Examples of a Platonic Form other than mentioned in the lecture. Discussion on whether or not the forms really exists, and why. Some reasons for believing that a world of Forms exists separately from the world of concrete, individual things. Are appearances real for Plato? Are they real in fact?
6. Aristotle's first philosophy. What are the four Aristotelian causes of a baseball? Aristotle believed that if individual horses didn't exist, then there would be no such things as the Form horse. Is this correct? Discussion with the help of an excerpt from Aristotle's Metaphysics.
7. Explanation of Augustine's solution to the problem of evil, and determination of whether or not it is sound. Explanation and evaluation of Aquinas's reasons for believing that ultimate human happiness does not consist in wealth, worldly power, or anything in this life. Compare and contrast the views of the Academics and the Pyrrhonists. Module 1 test.
8. "Nothing can be known." What is a powerful objection to this claim? "I do not know whether or not knowledge is possible." Critical evaluation of this claim. Suggestion of an argument to defend some version of total skepticism. Creation ex nihilo. Some reasons for thinking that creation ex nihilo is impossible. Compare and contrast Plato's The Good, Plotinus's One, and Augustine's God. Explanation of the difference between realism and conceptualism.
9. "Modern science undermines metaphysical dualism." Explanation of this remark. Explain how all mental activity reduces to matter in motion, according to Hobbes. "The things that really are in the world outside us are those motions by which these seemings are caused," Explain and critically evaluate this assertion by Hobbes.
10. The relationship of the mind to the body, according to Spinoza. Berkeley's reasons for saying that sensible objects exist only in the mind. Are the qualities of sensible objects (e.g., size, color, taste) all equally "relative" to the observer?

11. Definition and explanation of dualism, materialism, idealism, and neutralism. Explain and critically evaluate either Descartess "dream conjecture" or his "evil demon conjecture." Difference between primary and secondary qualities.
12. Do you ever observe anything other than your own perceptions? Explain. Explain what this means and what Hume's reasons were for holding it. Will the future resemble the past? Can you know that it will, or must you merely assume that it will?
13. Kant about the possibility of knowledge. The ordering principles of the mind. Things-in-themselves. If knowledge begins with experience, must it also rise from experience? Explain. Is it possible that we may someday experience an event that is in neither space nor time? If not, why not? Is it possible for extraterrestrial aliens to experience things that are not in space or time? Do infants have experience? Do cats? Fish? Explain. Can we have knowledge of things in themselves? Clarification of what you mean by "things-in-themselves."
14. Absolute Idealism: Hegel and Dialectical methodology. The notion of spirit and dialectic. The history of mankind as self-cognition of the Absolute. Triads and the human being as the vehicle of the absolute spirit.
15. The challenge of ethical relativism. Sophists and Socrates. Virtue ethics. Plato's ethical and political theories. Aristotle's ethical and political theories. Naturalism. Hedonism. Epicureanism. Stoicism. Morally good actions have in common? Defense of the view. "What is right is what you yourself believe is right." Critical evaluation of this statement.
16. The connection between virtue and happiness, in the philosophy of Plato. Explanation of how Plato's theory may be regarded as "complete." Happiness according to Aristotle. When can we be said to be virtuous, according to him? The connection between habit and moral character, for Aristotle. Compare and contrast of the ethical philosophies of Epicureanism and Stoicism. Evaluation of Aristippus's philosophy. (Excerpts from "Gorgias" by Plato)
17. Hobbes. Contractarianism. Egoism and altruism. Hume on moral judgements. Deontological ethics. Kant on reason and morals. Categorical imperative. Utilitarianism. Bentham and Mill. Nietzsche on two moralities. Beyond "good" and "evil". Do the consequences of an act determine whether it is good, or the intent with which the act has been taken? Or something else altogether? Kant held that there is no moral worth in helping others out of sympathy for them. What reasons are there for holding this view?
18. What does it mean to say that rational beings should be treated as ends and not as means? Was Bentham correct in saying that ought, right, good, and the like have meaning only when defined in terms of pleasure? Explain the difference between psychological hedonism and ethical hedonism. Was Mill correct in saying that some pleasures are inherently better than others? Explain the paradox of hedonism. What does Nietzsche mean when he says life is the will to power? Are moral value judgments merely expressions of taste? Explain. "There cannot be moral values if there is no God." Critical evaluation of this assertion.
19. Evolution of analytic philosophy: logical atomism, phenomenalism, and post-phenomenalist epistemology and metaphysics. Bertrand Russel, Ludwig Wittgenstein, John Dewey, Richard Rorty. Some reasons for believing that a human being is not a purely physical thing. If humans are purely physical things, could they have free will? Explanation. Assuming that it is possible to doubt the existence of physical things but not your own mental states, does that show that your mental states are not physical things? Module 2 test.

Text books and required supplies:

1. Philosophy: The Power Of Ideas, 11th Edition / Brooke Noel Moore and Kenneth Bruder.McGrawHill, 2023.
2. Humanly Possible: Seven Hundred Years of Humanist Freethinking, Inquiry, and Hope / Sarah Bakewell. Penguin Press. 2023
3. Stanford encyclopedia of philosophy http://plato.stanford.edu/

Evaluation and grading:
Monitoring progress is carried by the end of each of 2 modules (MCQ test on the portal).

Routine performance assessment (homework, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:
- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during breaks
- Using phone is allowed only during breaks

Example of module No. 1. Ancient, Hellenistic and Medieval Ohilosophy
Which of the following is the "fundamental metaphysical question"?
How should I live?
What can I know?
What is the nature of being?
What is the perfect form of government?

The question: “What is prior Mind or Matter?” refers to:
Epistemology
Ontology
Philosophy of science
Physics

3. … was the first to come up with the idea of perfect, eternal reality
Plato
Heraclitus
Pythagoras
Empedocles

4. Who worked out a four element doctrine of origin of the world?
Leucippus
Empedocles
Anaxagoras
Thales

5. Which does *not* apply to Plato's metaphysics?
Two realms
Theory of Ideas
Indivisible Forms
No independent existence apart from particular objects

6. Which doctrine of St. Augustine was at odds with Neoplatonism?
The unchanging God
The Incarnation of Jesus Christ
The nature of evil
The timelessness of God

7. What wasn’t among reasons Sextus said he had for thinking that one must suspend judgment on every issue?
We are never aware of any object as it exists independently of our perception
The thoughts and perceptions of one person differ from those of another
To every argument an equal argument is opposed
Nothing can be known for certain

Example of module No. 2 on the section of Modern Metaphysics and Contemporary Philosophy
1. According to Hobbes, the source of knowledge is
Motion in internal objects
Motion in external objects
Motion in mental processes
All of the above

2. Hobbes said that voluntary actions are caused by
Mental activity
Desire
Perception of outer objects
Decisions

3. Locke said that secondary qualities of things are
Size and shape
Color and weight
Extention, number and sound
Color, smell and taste

4. The doctrine that "there's nothing in the intellect that wasn't first in the senses" was accepted by
The rationalists
Spinoza
The empiricists
Descartes

5. David Hume said that
All our knowledge is limited to what we experience and what we discover by reason
All our knowledge is limited to what we discover by reason
All our knowledge is limited to what we experience
Infinite knowledge is possible (in principle)

6. Which of the following claims would be *rejected by* Kant?
All knowledge arises from experience
Relative to the experienceable world, Kant was not a skeptic
Relative to *das Ding-an-sich*, Kant was a skeptic
Perceptions, to qualify as experience, must be connected or unified in one consciousness

7. The distinction between phenomena and noumena is most closely associated with
G. W. F. Hegel
Immanuel Kant
John Stuart Mill
David Hume

EVALUATION OF THE MODULE ANSWER
The MCQ test comprises 30 questions and is designed be completed for 30 minutes as the time limit. The number of correct answers determines the final grade for the module:
27-30 correct answers are evaluated by excellent grade (91-100 with the step of 2,5 points per each correct answer);

23-26 correct answers are evaluated by excellent grade (81-90 with the step of 2,5 points per each correct answer);
19-22 correct answers are evaluated by excellent grade (70-80 with the step of 2,5 points per each correct answer).
The students that fails to be graded for the module may have a second chance at the end of the course before final examination

SAMPLES OF EXAM TICKETS
Question card #1
Topic: Definition of philosophy.

1. What is the ancient Greek and Roman definition of philosophy?
2. What is the definition of philosophy in Middle ages?
3. What is the definition of philosophy by I.Kant?
4. Why philosophical problems cannot be solved? (Give examples)
5. Why philosophical questions have consequences for everyone? (Give examples)

Question card #2
Topic: Main subject-areas of philosophy.

1. List all the philosophical disciplines with definitions.
2. Illustrate each discipline with 2-3 questions appropriate to that discipline.
3. How did early Greek philosophers understand being?
4. What was the main theme of Kantian epistemology?
5. What is the essence of ethics of Epicurus.

EVALUATION OF THE EXAM ANSWER

1. The evaluation criteria are as follows:

The correct and complete answer is "excellent";
The correct but incomplete answer is "good";
Incomplete answer with errors is "satisfactory";
The incorrect answer is "unsatisfactory";
Even if one module has not been passed, the student gets an "unsatisfactory" grade for the exam.
If all modules are successfully passed, the student starts the exam and takes an examination card.

2. The ticket consists of the theoretical task represented by three questions in accordance with the academic program of the discipline. The content of the discipline is structured in themes (sections). On the exam, the student is given the opportunity to view the academic program. Students are given 40 minutes to prepare a response to the questions in the card.

3. The interview with the teacher is conducted according to the following scheme: the teacher reads the student's written answer to the questions and then asks three additional questions (two of them are to test an understanding of the themes considered, the third one – beyond the card but within the program, to test knowledge of the discipline on the whole).

4. The Criteria for evaluating the response to questions:

90-100 (excellent)	clearly formulated personal position, combination of philosophical argumentation with textual information, correct use of scientific terminology, clear logical structure of the answer.
80-89 (good)	clearly formulated personal position, predominance of personal reflection over philosophical argumentation and textual information, the correct use of scientific terminology, clear logical structure of the work with insignificant faults
70-79 (satisfactory)	implicitly formulated personal position, predominance of personal reflection over philosophical argumentation and textual information, correct use of scientific terminology, implicit logic of work
69 and less (unsatisfactory)	implicitly formulated personal position, or lack of it, or a high share of borrowings, a lack of philosophical reasoning and terminology, implicit logic of work

Note: if the written answer is correct and complete, but the student's oral answers to the teacher's test questions are incorrect or incomplete, the final rating score is reduced.

5. If a student uses a cheat sheet, a mobile phone, headphones, a watch-cheat on the exam, then an act of violation of the procedure is drawn up. The student receives an "unsatisfactory" grade.

6. The final rating score of the student is calculated on the computer. It is transferred to the record books on the next day after the exam.

7. Retaking the exam in order to raise the grade is allowed with the permission of the Pro-rector for educational activities.

8. Pre-schedule passing of the exam in the discipline of Philosophy is allowed in special cases with the permission of the Dean's office and the head of the Department if appropriate documents are provided.

9. In the process of answering exam questions the teacher has the right to record the student's answers on a voice recorder. This procedure is carried out to avoid disagreement about the objectivity of assessing students' responses by the teacher.

FOREIGN LANGUAGE

Teachers teaching the course:
Associate Professor Fidaeva L.I., Associate Professor Chevela O.V., Associate Professor Fedotova S.I., Associate Professor Evdokimova A.G., Associate Professor Amirova R.M., Associate Professor Svetlova R.M., Associate Professor Ibragimova L.G., Associate Professor

Alikova E.A., Associate Professor Kuznetsova E.G., Associate Professor Gilemshina A.G., Senior Lecturer Fomina S.E., Senior Lecturer Yakubova L.S., Senior Lecturer Nikityuk V.P., Senior Lecturer Baltaeva V.T., Senior Lecturer Yusupova L.G.
Building, department, auditorium #. NUC, Department of Russian and Tatar languages.
Developer(s):
Associate Professor of the Department
of Russian and Tatar Languages O.V. Chevela
Associate Professor of the Department
of Russian and Tatar Languages S.I. Fedotova
Phone number: 88432364530

Courses: 1
Semesters: 1,2
Total 252 hours.
Practical classes (seminars) 180 hours.
Independent work 36 hours.
Exam – 2nd semester (36 hours)
Credit units of labor intensity (ZET) 9

Course Description:
Russian language is a general purpose of the discipline "Foreign language" in a medical university has an applied, practical orientation and is designed to solve the problems of teaching Russian to foreign students of a medical specialty in order to prepare for clinical practice in Russian, to live and study in a Russian language environment, to perceive the basic values of Russian culture. To study the discipline, knowledge, skills and abilities are required in the amount of the basic level (A1) of proficiency in Russian as a foreign language, namely:
Know:
- methods of independent work with educational material;
- didactic units for study and (or) repetition (reinforcement);
- educational and methodological materials (textbooks, teaching aids, electronic training programs, etc.) necessary for effective independent and scientific work;
- the main communicatively significant grammatical categories of the Russian language (independent parts of speech, prepositions, conjunctions), syntax of simple and complex sentences in accordance with the profile being studied;
- the main methods of combining lexical units and the main word-formation models;
- elementary norms of Russian speech etiquette;
- 1300 units of common vocabulary;
Be able to:
- deepen and expand theoretical knowledge and practical skills in the discipline;
- perform current work on educational material; tests and assignments in practical classes;
- work with banks of tasks, multimedia educational, information and reference and control programs, prepared special audio and video materials.
- activate cognitive activity;
a) in reading:

- be able to read texts taken from different sources, understand the basic and additional information of adapted texts of regional studies, informational and journalistic, social and professional nature;
- read and understand texts from the social and cultural and social and everyday communication spheres, using different types of reading.
- read texts from recommended educational literature, extract the necessary information and convey it orally and in writing with varying degrees of condensation;
- make various types of plans for the texts read;
b) in listening
- listen to and understand the information contained in a monologue,
- audit the information of an oral message from the social and cultural and social and everyday sphere of communication with subsequent transmission of its content with varying degrees of condensation;
c) in speaking
- understand the basic information presented in individual monologues and dialogues of a social and everyday and socio-cultural nature;
- be able to initiate a dialogue in simple situations of a standard type, maintain a conversation about oneself, a friend, family, studies, work, learning a foreign language, working day, free time, hometown, health, weather, etc., and also construct one's own statement based on the text read;
- use the acquired skills of formulating statements about one's intentions in a limited set of situations
- apply grammatical norms and a minimum vocabulary in speech.
- independently generate a text according to a specified model, construct a coherent detailed statement on a given topic, be able to conduct dialogues of various types;
- express one's own attitude to the facts, events set out in the text, the characters and their actions.
- understand the content of the interlocutor's statements;
- adequately respond to the interlocutor's remarks;
- establish and maintain social contacts with other people (acquaintance, greeting, addressing acquaintances and strangers, expressing gratitude and apologies
- express assessments, opinions and subjective-emotional attitudes towards persons, objects, events and actions;
- receive and transmit specific information about people, facts, events.
- apply grammatical norms and a minimum vocabulary in speech.
d) in writing
- be able to write a short letter, note, congratulations, etc., outline the main content of the source text, based on questions
- construct a written monologue of a reproductive nature based on a read or listened to text in accordance with the communicative setting;

Have:
- linguistic, speech and actually communicative material necessary for solving the following communicative tasks:
- master the elementary norms of the Russian literary language;

- speech genres of question and communication of information;
- oral and written speech skills.
- linguistic, speech and communicative material, necessary for mastering the elementary and basic level for solving the following communicative tasks:
- master the norms of Russian speech etiquette when meeting people, when addressing senior members of the teaching staff;
- speech genres of asking and communicating information, greetings, farewells, gratitude, requests, refusals, apologies and congratulations.

Course objectives: The purpose of mastering the discipline
Within the framework of a given program, three learning purposes are implemented: practical, general education, and educational.
In a language environment, learning is complex, as it includes: 1) a practical (communicative) goal, i.e. the purpose of learning to communicate in Russian;
2) an educational purpose, i.e. the purpose of expanding the cognitive base of students through the formation of metalanguage, regional studies, professional and universal knowledge;
3) the educational purpose, which consists in forming a positive attitude among foreign students towards Russia, its history, culture, and people.
The general education purpose is to form for l students
knowledge of regional studies (about the geography and history of Russia, about the current state of society, about material and spiritual culture);
about the Russian language in comparison with the native language — knowledge that allows you to assimilate a new system of concepts through which reality can be perceived.
The educational purpose also involves the development of:
- attention, memory and thinking;
- communication and cognitive abilities;
- general academic skills and abilities — to work with a book and a dictionary, express your thoughts in written and oral forms, etc.
Educational purpose are solved in the course of academic and extracurricular work and are aimed at forming students' commitment, tolerance, the ability to behave with fellow students, seniors and patients, to comply with the internal regulations of KSMU, the rules of stay in the territory of the Russian Federation.
Educational purpose and objectives of the course
1. Fostering tolerance towards representatives of a foreign cultural environment.
2. Teaching the basic techniques of effective intercultural interaction.
3. Fostering interest in further study of the Russian language system.
4. Education of a harmoniously developed linguistic personality.

List of language competencies acquired by students upon completion of their studies:
1. Pronunciation and intonation minimum:
2. Word formation and morphology:
2.1. Word composition.

2.2. Grammatical minimum.

A) Noun. Animate and inanimate nouns. Gender and number of nouns. Case system of nouns. Formation, meaning and use of cases.
B) Pronoun
C) Adjective
D) Verb
E). Numeral.
E) Adverb.
G) Service parts of speech
3. Syntax.

The place of the discipline (module) in the structure of the educational program
The discipline "Foreign Language" refers to the humanitarian cycle of disciplines.
The discipline "Foreign Language" in the 1st year is a new discipline and does not imply a connection with other previous courses and disciplines.
The discipline "Foreign Language" is auxiliary in the study of the following disciplines: history of pharmacy, botany, physiology with the basics of anatomy, philosophy, microbiology, etc. The peculiarity of the discipline is its applied and practical focus - preparing students for clinical practice, transferring theoretical knowledge to the sphere of professional communication in the country of their immediate residence and training.
The area of professional activity of foreign graduates who have mastered the pharmacist program includes pharmaceutical activity in the sphere of circulation of medicines in Russian, in accordance with the current legislation of the Russian Federation and professional standards.

Learning objectives of the discipline:
As a result of studying the discipline, students must master the following competencies:
UK-4 Able to apply modern communication technologies, including in a foreign language(s), for academic and professional interaction.
ID-1UK-4 Establishes and develops professional contacts in accordance with the needs of joint activities, including the exchange of information and the development of a unified interaction strategy
ID-2UK-4 Compiles, translates from a foreign language into the state language of the Russian Federation and from the state language of the Russian Federation into a foreign language, and edits various academic texts (abstracts, essays, reviews, articles, etc.), including in a foreign language
ID-3UK-4 Presents the results of academic and professional activities at various public events, including international ones, choosing the most appropriate format
ID-4UK-4 Arguably and constructively defends his or her positions and ideas in academic and professional discussions in the state language of the Russian Federation and a foreign language
ID-5UK-4 Selects a communication style in the state language of the Russian Federation and a foreign language depending on the purpose and conditions of the partnership; adapts speech, communication style and sign language to interaction situations

Calendar of practical classes

№	Sections / Topics Discipline	Total labor	Types of educational activities, including independent work of students and	Forms of current

			workload (in hours)			monitoring of academic performance
			Topics of educational activity, including independent work of students and workload (in hurs)		Independent work of students	
			lectures	Practical classes		
	Section 1. Introductory phonetic course (Lessons: 1-5).			51	30	
1.	Topic 1.1. Phonetics. Vowels. Voiceless and voiced consonants. Sonants. Intonation constructions IK-1 and IK-4. Complex sentences with connecting and adversative conjunctions.			12	8	dictation, role play, reading subtest, listening (distance course).
2.	Topic 1.2. Phonetics. Correlation of phonemes and their letter designations. Affricates. Category of gender. Classes of pronouns			8	8	dictation, role play, reading subtest, writing subtest, speaking subtest, listening subtest.
3.	Topic 1.3. Phonetics. Soft consonants.			12	8	Vocabulary dictation, dictation with grammar task, role play, test,

	Grammar. Category of number. Category of animate/inanimate. Concept of conjugation. Verbs of the first conjugation. Concept of subject and predicate.					listening and a test (distance course).
4.	Topic 1.4. Meaning of the direct object. Verbs of the second conjugation. Category of adverb. Adverbs of manner.			15	6	Reading subtest, speaking subtest, writing subtest, listening subtest.
4.	Control lesson on section 1.			4		Control work on section 1. Lesson 5
	Section 2. *Elementary level. Initial stage of learning Russian. Prepositional-case course (Lessons: 6-10)*			54	45	
5.	Topic 2.1. Gender and number of adjectives. Adjectives and adverbs of manner. Infinitive constructions. Future complex tense of the verb			12	12	test, reading subtest, speaking subtest, writing subtest
6.	Topic 2.2. Prepositional case in the meaning of place. Adverbs of place and time. Past tense of the verb. Cardinal numbers.			14	12	dictation, dictation with grammar task, reading subtest, speaking subtest, writing subtest, role play, test, Listening and test (distance course).
	Topic 2.3. Prepositional case of			10	10	dictation, dictation with grammar task,

	nouns and personal pronouns in the meaning of place and object of speech and thought. Prepositions в, на, о (об).					reading subtest, speaking subtest, writing subtest, role play, test, Listening and test (distance course).
7.	Topic 2.4. The concept of verb types. Use of verb types in the past tense. Infinitive constructions. Demonstrative pronouns.			14	11	dictation, dictation with a grammar task, reading subtest, speaking subtest, writing subtest, role-playing game, test.
8.	Test lesson for section 2. (Lesson 10)			4	-	Grammar control-testing. Subtest Listening and test (distance course).
	Total	180		105	75	
	Exam	36				

Methodological materials defining the procedures for assessing knowledge, skills, abilities and (or) experience of activities characterizing the stages of competency formation

The procedure for assessing learning outcomes is carried out on the basis of the Regulation of Kazan State Medical University on the forms, frequency and procedure for current monitoring of academic performance and midterm assessment of students. The following types of students' educational activities in the discipline "Foreign Language" are subject to current monitoring of academic performance (hereinafter referred to as CMAP): attendance of practical classes, results of independent work. CMAP is conducted by a teacher assigned to implement the educational program in a specific academic group or a teacher responsible for the types of educational activities of students.

When conducting practical classes, it is envisaged to use active forms of classes, built in a traditional form (including a survey) and using interactive teaching methods, in combination with extracurricular (independent) work with the support of a teacher.

The current control is conducted at each lesson to check the degree of development of specific skills and the level of proficiency in the studied dose of language material, to stimulate students' academic work, and to improve the methods of teaching the discipline. It can be conducted during all types of classes in the form selected by the teacher or provided for by the subject plan. The results of the current control are reflected in the log of academic classes and are used by the department for the operational management of the educational process.

The current control of academic performance should be organized and conducted in such a way as to identify:

- the degree of development of students' skills and abilities in each section and topic;
- the degree of responsibility of students for academic work, the level of development of their abilities, the reasons that prevent them from working productively;
- the level of mastering the skills of independent work;
- deficiencies in the organization and conduct of classes (independent work).

Based on the analysis of the results of the current control, each teacher must promptly outline measures to eliminate the identified deficiencies in the organization of the educational process in the discipline of the department. Well-organized and methodically competently conducted current control should stimulate students' interest in studying the Russian language, increase their activity in learning, and also develop the habit of systematically working independently on the educational material.

Students' work is assessed during practical classes, which involves doing exercises (orally and in writing), oral answers.

The student's answer is estimated at 10 points.

Current control of the results of independent work in workbooks, written tests, oral surveys, and test control is carried out in the form of assessing the results of independent work in workbooks, completing written tests, oral surveys, and testing. Current control of the results of independent work is carried out at each lesson for all students. At the end of each section of the thematic plan (module), the current control is carried out for all students in the group. During practical classes, the teacher evaluates any, especially successful action (for example, participation in a discussion), only the solution of a full-fledged problem is marked. Teachers will strive to determine the assessment in the dialogue (external assessment of the teacher + external assessment of students + self-assessment). The student has the right to challenge the grade given. A separate mark is given for each academic task or group of tasks demonstrating mastery of a separate skill.

The assessment of students' academic performance on a separate topic is expressed on a 10-point scale, where 0-6 – "bad", 7 - "satisfactory", 8 – "good", 9 – "very good"and 10 - "excellent".

Module on a 100-point scale. The assessment must be reflected in the academic journal.

69 (unsatisfactory):

Non-attendance of practical classes or a large number of absences.

Incorrect response or refusal to respond

Lackofactivityin class

Low level of material proficiency.

Independent work:Tasks for independentwork are not completed, either they contain a lot of errors, or there is a high percentage of plagiarism.

Lexical and grammatical errors in tasks.

70-79 (satisfactory):

Attend most of the practical classes

The answer is correct, but not sufficient

Low activity in the classroom

Low level of material proficiency.

Independent work:
Tasks for independent work are completed, but with errors or with an average level of borrowing
Lexical and grammatical errors in tasks.
80-89 (good):
Attending all practical classes, skipping only for a valid reason
Correct, sufficient answer.
Average activity per class
Average level of material proficiency.
Independent work:
Tasks for independent work are mostly performed without errors and with a small amount of borrowing.
There are no lexical or grammatical errors.
90-100 (excellent):
Attending all practical classes, skipping only for a valid reason
Regular correct answers, includingusing additional literature
High activity in the classroom
Fluent knowledge of the material.
Independent work:
Tasks for independent work are completed without mistakes or borrowing
There are no lexical or grammatical errors.

90-100 points – the student demonstrates knowledge of the minimum vocabulary of a conversational nature, the ability to understand elementary questions by ear (conversation), correctly use grammatical forms, good command of all types of speech activity, possession of both productive and reproductive speech skills.
80-89 points - the student has sufficient command of all types of speech activity, mainly correctly uses the lexical minimum and the studied grammatical and syntactic material in oral and written forms of expression, demonstrates sufficient competence in the socio-cultural and socio-everyday spheres of communication with native speakers. The mistakes made are not of a communicative nature, reproductive speech skills prevail.
70-79 points – the student has a poor command of all types of speech activity, has a limited vocabulary and does not always use it correctly, has significant difficulties in using the studied grammatical and syntactic material in oral and written forms of expression, makes a significant number of communicative errors, demonstrates only reproductive speech skills, has low competence in the socio-cultural and social-everyday spheres of communication with native speakers.
less than 70 points - the student has practically no command of the main types of speech activity, the lexical minimum and lexical and syntactic material, finds it difficult to use the studied material in both forms of expression. The mistakes are of a communicative nature, competence in the socio-cultural and socio-everyday spheres of communication with native speakers has not been formed.
The final (rating) grade is made up of grades for modules (maximum 100 points per module), the current grade (maximum 10 points). Assessment and evaluation criteria:

List of primary and secondary educational literature required for mastering the discipline (module)

Primary educational literature

List of primary literature Number of copies

1. Moskovkin L.V., Silvina L.V. Russian language. Elementary course for foreign students. Publishing house SMIOPress, 2014. – 528 p.
2. Shustikova T.V., Kulakova V.A. Russian language is my friend. Basic level.- 6th ed., corrected. And add.- Moscow: RUDN, 2014. – 849 p.

Additional educational literature

1. Evdokimova A.G., Baltaeva V.T. Phonetics: from A to Z: a teaching aid for foreign students. – Kazan, KSMU, 2011. – Part 1.
2. Evdokimova A.G., Baltaeva V.T. Phonetics: from A to Z: a teaching aid for foreign students. – Kazan, KSMU, 2011. – Part 2.
3. Evdokimova A.G., Baltaeva V.T. Russian language in stories and dialogues: a teaching aid for foreign students. – Kazan, KSMU, 2012. – Part 1.
4. Evdokimova A.G., Baltaeva V.T. Russian language in stories and dialogues: a teaching aid for foreign students. – Kazan, KSMU, 2012. – Part 2.
5. Evdokimova A.G., Baltaeva V.T. Cases: a teaching aid for foreign students. – Kazan, KSMU, 2011. – Part 1.

6 Kuznetsova E.G. Verb: a teaching aid for foreign students. – Kazan, KSMU, 2011.

7 Yakubova L.S., Kuznetsova L.G. Preparing for the final exam in Russian: a teaching aid for foreign students. – Kazan, KSMU, 2012. – Part 1.

8 Yakubova L.S., Baltaeva V.T., Nikityuk V.P. Russian-Hindi educational dictionary: for foreign first-year medical students studying in an intermediary language: more than 3190 units. – Kazan, KSMU, 2014. – 116 p.

9. Anikina M.N. Stairs: a textbook on the Russian language for beginners. For English-speaking students. – M.: Russian language. Courses, 2015. – 463 p.
10. Akishina T.E. Learn Russian in 10 days in a new way (for English speakers). – M.: Russian language. Courses, 2015. – 223 p.
11. Koprov V.Yu. Syntax of the Russian language for doctors and biologists. Object and adverbial relations. M.: Russian language. Courses, 2017. – 327 p.
12. Babalova L.L. Workshop on Russian grammar: 2 hours – Part 2. – M.: Russian language. Courses, 2017. – 351 p.
13. . Khavronina S.A. Russian in exercises: a tutorial. – M.: Russian language. Courses, 2018. – 328 p.

List of resources of the information and telecommunications network "Internet" (hereinafter referred to as the "Internet") required for mastering the discipline (module

1. Fedotova S.I., Chevela O.V. Russian as a Foreign Language. Part 1. Elementary Level. – Distance Course. – http://www.kgmu.kcn.ru:40404/moodle/course/view.php?id=467
2. Portal on Russian as a Foreign Language “RussNet” (in English).
http://www.russnet.org
3. Resources for Students of Russian Language and Culture of Russia (Russian Studies Department, Bucknell University) (in English).
http://www.departments.bucknell.edu/russian

4. Evdokimova A.G., Baltaeva V.T. Russian Language in Stories and Dialogues: A Teaching Aid for Foreign Students. – Kazan, KSMU, 2012. – Part 2.
5. Russian for everybody (Russian language for everyone) – Russian as a foreign language course RUDN 2000 (Russian and English versions).
http://www.LinguaRus.com
6 Russian Web Tutor (Interactive materials on Russian as a foreign language)
http://www.auburn.edu/~mitrege/RVT
7. . Materials on Russian as a foreign language by Professor T. Bayer (Middlebury College).
http://www.middlebury.edu/~beyer/mapryal/
http://www. gramota.ru
8. Electronic catalog of the scientific library of KSMU [Electronic resource].
URL: http://library.kazangmu.ru
9. Electronic library system of KSMU Copyright holder: scientific library of KSMU (FS on intellectual property No. 2012620798, registration date 17.08.2012) [Electronic resource]. URL: http://old.kazangmu.ru/lib/
10. Electronic library system elibrary.ru — electronic versions of Russian scientific and technical journals. Current agreement No. D-3917 dated 14.02.2017. Access period: 14.02.2017 — 14.02.2018. Unlimited access from university computers [Electronic resource]. URL: http://elibrary.ru
11. Culture of written speech [Electronic resource]. URL: www.gramma.ru, free.
12. Encyclopedic Dictionary of Medical Terms [Electronic resource].
URL: http://studentmedic.ru
13 Russian dictionaries [Electronic resource]. URL: www.slovari.ru
14. National Corpus of the Russian Language [Electronic resource]. URL: www.ruscorpora.ru
15 Practical skills for a graduate of a medical university [Electronic resource] / Bulatov S.A., Anisimov O.G., Abdulganieva D.I., Akhmadeev N.R., Bikkineev F.G., Gorbunov V.A., Orlov Yu.V., Petukhov D.M., Sadykova A.R., Sayapova D.R. - Kazan: Kazan State Medical University. – Access mode: http://www.studmedlib.ru, free.

Methodological guidelines for students on mastering the discipline (module)
Requirements for completing the test.
The test is aimed at identifying the level of students' mastery of lexical and grammatical knowledge, skills and abilities on the topics covered. The work indicates the topic and the student's full name, without a title page. The work is done on a computer or by hand in neat, clear handwriting. When completing the work, it is not allowed to use a textbook, dictionaries, or other reference materials. If necessary, you can use a draft. Entries in the draft will not be checked or assessed.
Requirements for conducting an individual interview
The interview is conducted according to a list of questions known to students in advance, individually with each student. The latter must, having received the questions, explain the concepts that are given in these questions. The student does not receive additional time for preparation. No more than 5 minutes are allocated for working with one student.
Requirements for written answers to questions

The work is submitted in writing, no more than 15 to 20 minutes are allocated for them. The work must be individual in nature, if several works coincide, the teacher has the right to cancel them.

Requirements for tasks for assessing skills and abilities

The tasks are completed in the classroom, during practical classes. The tasks are individual in nature, the teacher has the right to decide whether to give them orally or in writing.

Requirements for test tasks

Tests for elementary and basic levels are used by the teacher to check the residual knowledge of students. Test tasks are designed for independent work without the use of auxiliary materials. To complete a test task, the student must carefully read the question. After reading the question, you should start reading the proposed answer options. You must read all the options and choose only one index (digital designation) as an answer, corresponding to the correct answer. In each test, only one of the options is correct. The choice must be made in favor of the most correct answer. A limited time is allocated for completing the test. It may vary depending on the level of the test takers, the complexity and volume of the test. As a rule, the time for completing a test task is determined based on the calculation

Requirements for situational tasks (role-playing games) - case method:

Case method is a form based on the study, analysis, and comprehensive consideration of a problem that is relevant for a given group of students. They must analyze the situation, understand the essence of the problem, propose possible solutions, and choose the best one. The essence of this method is that students are asked to find a solution to a situation that relates to real-life problems and the description of which reflects a practical task. A distinctive feature of this method is the creation of a problem situation based on facts from real life. Tasks are given in the form of special problems (cases), students gain knowledge as a result of analytical and creative activities. This method has a number of features that distinguish it from other interactive forms, for example: the central point is the problem, not the subject, the case must deal with a specific object, and not just with general theory, students are required to actively participate in the learning process, and not just be passive listeners.

The purpose of the elementary and basic levels of proficiency in the Russian language is the formation and further development of speech skills and abilities in all types of speech activity (reading, listening, speaking and writing), the formation and development of regional studies and socio-cultural competence.

To achieve this purpose, the main study time is allocated to practical work on the skills and abilities of speech communication, including: 1) teaching the language system; 2) developing speech skills of speaking, listening, reading, writing; 3) familiarization with the culture of the country of the language being studied (Russian as a foreign language, Russian as a foreign language, Russian as a native language); 4) educational tasks.

When studying the academic discipline, it is necessary to use active forms of learning and master practical skills to generate oral and written texts that are correct from the point of view of various norms of the Russian language, and adequately understand oral and written texts created by native speakers for native speakers in the conditions of natural speech communication (authentic texts).

Language and speech material is selected and distributed taking into account its communicative significance - first, students are taught the grammar and vocabulary most necessary for communication. New linguistic phenomena are presented as part of speech samples that are related to one or several communication situations. The learning process itself is to a certain extent similar to the process of real communication, since the basis of learning is communicative practice, the constant implementation of conditional communicative and genuine communicative exercises. All actions of the teacher and students are directed/

Rules of student conduct in classes on the subject "Foreign language":
- attend classes regularly;
- do homework;
- be prepared for class;
- not be late;
- listen carefully to the teacher's explanations;
- actively participate in discussions on a given topic;
- do not talk about abstract topics;
- be polite to others, observe the rules of etiquette of speech communication;
- use a mobile phone only with the teacher's permission and only for educational purposes;
- do not eat or drink;
- do not use obscene expressions, gestures;
- do not make noise;
- have a neat appearance, wear a white coat.

Standard control tasks or other materials necessary for assessing knowledge, skills and (or) experience of activities that characterize the stages of competence formation in the process of mastering an educational program

Letter dictation.
А, Д, Ж, З, Я, Х, С, Т, П, Р, Н, Ф, Ц, Й, Ю, У, К, Т, Ш, Щ, О, Ь, И, И, Ы.

Syllabic dictation.
ма-па-на
та-да-ба-па
шо-жо-со-зо
ду-му-ну
лэ-гэ-кэ
Task 1. Write the plural form.
Страна, аудитория, словарь, подруга, окно, картина, студент, студентка, карандаш, ручка.
Task 2. Fill in the table:

он	она	оно

Слова для справок: группа, журнал, тетрадь, стол, яблоко, сыр, масло, шарф, шкаф, семья, подруга.

Task 3. Complete the exercise according to the example:
Образец: Это я, а это мой друг.
1. Это ты, а это … дом. 2. Это вы, а это…класс. 3. Это Анвар, а это…комната. 4. Это мы, а это…группа. 5. Это студенты, а это… институт. 6. Это Нина, а это… сумка. 7. Это я, а это… папа и мама.

Task 4. Insert possessive pronouns instead of periods:
– мой, моя, мое:
Это…друг. Это… тетрадь. Это…яблоко. Это…мама.
– твой, твоя, твое:
Это … ручка. Это … дом. Это … молоко. Это … папа.
– наш, наша, наше:
Это … класс. Это … столовая. Это … окно. Это … институт.
– Это … город. Это … столица. Это…журнал. Это … страна. Это … окно.

Task 5. Answer the questions according to the example:
Образец:
– Чей это карандаш? *– Чей это карандаш?*
– (я) *– Это мой карандаш.*
1. – Чья это тетрадь? 2. – Чей это класс? 3. Чье это яблоко?
– (я) – (мы) – (она)

1. – Чья это сумка? 2. – Чье это молоко? 3. Чей город?
– (ты) – (он) – (вы)

Intermediate module assessment criteria:

The control work has 5 tasks.
Completion time: 60 minutes.
70-79 points – satisfactory
80-89 points – good
90-100 – excellent
1 correct answer – 2 points. 15 incorrect answers – 70 points. 16 or more errors – fail.

Test
Instructions for completing the test
Time to complete the test - 50 minutes. You can use a dictionary when completing the test.
You have received a test. It consists of 3 parts and 30 test tasks. Choose the correct answer and mark the corresponding letter on the matrix.
PART I Tasks 1-5. Read the announcements. Say what a person should do if he understood them correctly.
1. В пятницу и субботу библиотека не работает. Вы можете взять книги в библиотеке ... .
(А) в понедельник (Б) в среду и субботу (В) в пятницу
2. Единый билет на все виды транспорта можно получить 25-27 марта. Вы можете получить билет в ... месяца. (А) начале (Б) середине (В) конце

3. Всем студентам необходимо получить в деканате студенческие билеты. Все студенты должны ... . (А) купить билеты на самолёт (Б) взять студенческий билет (В) получить студенческую визу
4. Расписание занятий по русскому языку висит на втором этаже. Вы хотите посмотреть расписание, поэтому Вам нужно ... . (А) спуститься на первый этаж (Б) пойти на второй этаж (В) подняться на третий этаж
5. Пожалуйста, не курите в коридоре. (А) В коридоре нельзя курить. (Б) Курить можно только в коридоре. (В) Все курят в коридоре.
Задания 6-10.
Прочитайте фразу и найдите ту, которая является продолжением прочитанной.
6. Мой друг отдыхает. (А) Он говорит только по-китайски. (Б) Будьте добры, говорите медленнее. (В) Прошу вас, не разговаривайте так громко.
7. Здесь так холодно. (А) Закройте, пожалуйста, окно. (Б) Включите, пожалуйста, свет. (В) Не курите, пожалуйста, здесь.
8. Извините, я сегодня опоздал. (А) В автобусе было много народа. (Б) Долго ждал автобуса. (В) На улице шёл дождь.
9. Я очень плохо себя чувствую. (А) Кабинет врача находится на втором этаже. (Б) Лекарство можно купить в любой аптеке. (В) Мне надо пойти к врачу.
10. Прекрасный костюм! Но он мне мал. (А) У вас есть другой размер, больше, чем этот? (Б) К сожалению, он слишком дорогой для меня. (В) Сколько стоит этот костюм?

The purpose of the test is to check the level of development of speech skills. The following skills are the objects of control: - predict a response based on what has been read (tasks 1-5); - predict the content that may be a continuation of the message read (tasks 6-10); - understand the basic information contained in the text, as well as some details that carry an important semantic load.

Exam (certification) materials – 2nd semester

Approximate topics for a monologue:

1. Россия (Russia)
2. Моя страна (My home country).
3. Праздники в России (Holidays in Russia).
4.Праздники в моей стране (Holidays in my country).
5.Город, в котором я учусь (The city where I study).
6. КГМУ (KSMU)
7. Великие люди России (Great people of Russia).
8.Древняя Русь (Ancient Rus'_
9. Великие люди моей страны (Great people of my country).
10. Мой родной город (My hometown).

Approximate topics for a dialogue:

1. Знакомство в общежитии (Acquaintance in a hostel).

2.В поликлинике (In a clinic).
3. У врача (At the doctor's).
4. В деканате (In the dean's office).
5.В столовой (In the canteen).
6. Разговор по телефону (Conversation on the phone).
7. Наше расписание (Our schedule)
8. В аэропорту (At the airport).
9. Друг болен. Вызов врача (A friend is sick. Calling a doctor).
10. В библиотеке (In the library).

Example of an examination ticket
1.Монологическое высказывание по теме «Праздники в России»
2.Диалог «У врача»
Answer standards
1. В России есть много национальных праздников. Люди во всей стране не работают. Главные государственные праздники: Новый год, 23 февраля, 8 Марта, 1 Мая, День Победы и День Независимости.
Первый праздник года — Новый год. Люди встречают новый год в полночь с 31-го декабря на 1 января.
Существует много новогодних традиций в России. В каждом доме есть новогодняя елка. Дети всегда ждут, чтобы пришел Дед Мороз и подарил им подарки. Новый год — семейный праздник.
Еще один праздник в России — Рождество. Он отмечается 7-го января. Это — религиозный праздник. Много людей идут в церковь в этот день.
Неофициальным «Мужским днем» является 23-е февраля, это — праздник, который называется «День Защитника Отечества». В этот день женщины обычно дарят мужчинам небольшие подарки.
8-го марта празднуют Женский День, когда мужчины делают все по дому, поздравляют женщин, дарят им цветы, говорят красивые слова.
1-го мая — День Труда. \
Самый большой национальный праздник — День Победы. 9-го мая 1945 года Советская Армия одержала победу над немецкими фашистами. Многие ветераны принимают участие в военном параде. Радио и телевидение передают популярные военные песни. Много гостей из разных стран мира приезжает в Москву.
12 июня - День независимости — новый российский праздник. 12-го июня 1992 года был избран первый президент России.
1-го сентября — День Знаний — это начало учебного года. Дети идут в школы с цветами для учителей.
12-го декабря — День Конституции. В этот день в 1993 г. была принята первая Конституция Российской Федерации..
Еже один религиозный праздник – Пасха. В этот день люди ходят в церковь. Перед этим праздником дома красят яйца, пекут куличи.
В России много профессиональных праздников, которые не являются выходными днями.

2. Пациент: Здравствуйте! Можно?

Врач: Здравствуйте! Как Ваша фамилия? Пациент: Иванов. Иванов Сергей Петрович.
Врач: Как Вы чувствуете себя?
Пациент: Плохо. У меня болит голова и горло.
Врач: Какая у Вас температура? Пациент: Тридцать семь и восемь.
Врач: Откройте рот... Всё понятно. У Вас ангина. Вот рецепт. Купите в аптеке лекарство.
Пациент: Большое спасибо. До свидания.
Врач: До свидания. Будьте здоровы.

FOREIGN LANGUAGE IN PROFESSIONAL ACTIVITIES

Teachers: Associate Professor Svetlova Rozalia Mansurovna, Associate Professor Ibragimova Leysan Galiakhmatovna, Senior Lecturer Lisina Gulnara Monirovna
Building, Department, classroom # NUK, Department of Русского и татарского языков, 437, 430, 454

Contact details:
Telephone number: 89033871927 (associate professor Svetlova R.M.)
E-mail address: Habibi&rozana@mail.ru
Office and working hours: 437 (9-17)

Class hours - total 180:
Practical classes: 108 hours
Self-study: 72 hours

Course description:
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University.

Course objectives: The purpose of mastering the discipline
The objectives of mastering the academic discipline "Foreign Language in Professional Activity" are:
– achieving the required level of educational and professional communication in Russian;
– solving professional and communicative problems of future pharmacists in the production and practical sphere.

Tasks of the discipline:

to promote:
- the acquisition of language, speech and communication skills by foreign students;
- practical implementation of various types of language intentions;
to teach foreign students:
- to use language tools correctly;
- navigate and implement communicative intentions according to social status in various situations and areas of communication, including professional; - be proficient in oral and written forms of the Russian language.

Course topics:

Calendar plan of practical classes

Chemistry. Complex and simple substances. Chemical reactions. Composition of a substance. Categories of number of nouns. Present tense of verbs of the first and second groups. Numerals. Grammatical construction "How much does it cost?"

The structure of the atom. The periodic table of chemical elements. The chemical composition of the cell. Adjectives and adverbs. Past and future tense of verbs. Meanings of the prepositional case of nouns and pronouns.

Inorganic substances. Water. Mineral salts. Accusative case of inanimate and animate nouns and pronouns. Expression of time.

Organic substances. Proteins, fats, carbohydrates and nucleic acids. Verbs of motion in Russian. Imperfective and perfective verbs. Meanings of the genitive case of nouns and pronouns.

Prescription. Prescription details. Extemporaneous prescription. Instructions for use of the drug. Verbs NSV and SV in the meaning of repeatability and fact of action.

Indications for use of drugs. Contraindications. Side effects of drugs. Future tense of verbs. Imperative mood of verbs.

Module on topics 1-6.

Drug overdose. Interaction with other drugs, food. Special instructions. Dative case of adjectives. Accusative case of adjectives. The construction "who has what" in the present, past and future tenses.

Conditions of dispensing medicinal products (prescription and over-the-counter). Rules for taking medicinal products. Expiry date. Genitive case of adjectives. Genitive, prepositional, dative and accusative cases when indicating place and direction of movement.

Pharmacology. Famous pharmacists. Creation of medicines. Instrumental case of adjectives. Prepositional case of adjectives.

Module on topics 8-10.

Phytotherapy. Vitamins. Antibiotics. Genitive and prepositional cases when expressing time.

History of the creation of pharmacy. Types of pharmacies. Storage of medicines in a pharmacy. Comparative and superlative degrees of adjectives. Expression of time, purpose and conditions.

Dosage forms. Methods of administration of drugs. Dosage of drugs. Direct and indirect speech. Transitive verbs of motion with and without a prefix. Verbs of motion in a figurative sense.

Module on topics 12-14.

Outcoming testing. Final test.

Text books and required supplies:

1. Русский язык в медицинском вузе. Часть 1. / Р.М.Светлова, Л.Г.Ибрагимова. – Казань: КГМУ, 2017. – 166 с.
2. Биология: Человек (Введение в научный стиль речи): сборник текстов по русскому языку дли иностранных студентов / Л.И.Фидаева, И.Б.Вагапова, Л.С.Якубова, Л.Г.Юсупова. – Казань: КГМУ, 2015. – 96 с.
3. Живём и учимся в России. Рабочая тетрадь по грамматике. – СПб: Златоуст – ИМОП СПбГПУ, 2003. – 192 с.
4. Хавронина С.А. Русский язык в упражнениях: Учебное пособие (для говорящих на английском языке)/ С.А.Хавронина, А.И.Широченская. – М.: Русский язык. Курсы, 2015.- 384 с

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of module No. 1. Fundamentals of General Chemistry

Задание 1. Напишите правильные формы глаголов:

Модель – бегать (я бегаю, ты бегаешь, они бегают) *(Каждое предложж. = 2 б.)*

Идти, ехать, бежать, носить, везти, ездить, плыть, летать, водить, ходить.

Задание 2. Вставьте подходящий глагол (идти, ходить, ехать, ездить, бежать, бегать, лететь, летать, плыть, плавать, нести, носить, вести, водить, везти, возить) *(Каждое предложение = 2 б.)*

1.Этот самолёт каждую неделю … в Берлин. 2. Куда вы ... на этой машине сейчас? 3. Летом мы часто … в реке. 4. Ахмед никогда не … с собой ручку. 5. Когда Иван … по парку, он встретил своего преподавателя. 6. Каждый год наша семья … отдыхать на море.

Задание 3. Найдите ошибки в предложениях. *(Каждое предложение = 2 б.)*

1.Мама бежит дочку к врачу. 2. Он летит на автобусе в кинотеатр. 3. Мария часто идёт в театр.

Задание 4. Поставьте правильный глагол из двух. *(Каждое предложение = 2 б.)*

1.(идти/ ходить) Вчера Анвар … на новый балет. Галина часто … по магазинам. 2. (ехать/ездить) Игорь … на работу каждый день. Когда он … на работу, он разговаривал с другом. 3. (лететь/летать) В прошлом году Игорь … в Египет.

Example of module No. 2 on the section of biophysical chemistry

Упр. 1 Ответьте на вопросы.

1.Где живут студенты? (университетское общежитие) 2. Где можно увидеть животных? (городской зоопарк) 3. Где вам нравится отдыхать летом? (Средиземное море) 4. О чём мечтает Иван? (дорогая машина)

Упр. 2. Допишите предложения.

До Москвы можно добраться … (поезд, самолёт, машина) Люди в парке катаются … (велосипед, скейт, самокат, роликовые коньки)

Упр. 3. Вставьте подходящий глагол из таблицы.

1.Мария … очень долго, потому что она еще маленькая. 2. Пётр любит … в белой рубашке. 3. В гардеробе все … 4. На приёме у терапевта всегда нужно …

EVALUATION OF THE MODULE ANSWER

The question card of the module consists of 5 tasks (fundamentals of general chemistry) and 8 tasks (biophysical chemistry).

Questions 1 - 5 on fundamentals of general chemistry are evaluated by 20 points (with the step of 5 points)

* The teacher has the right to remove from 1 to 3 points for incorrect writing of reactions, formulas, and equations

Total: 5 x 20 = 100 points

Questions 1 - 6 are evaluated by 10 points (with the step of 5 points) and questions 7-8 by 20 points

Total: 6 x 10 + 2 x 20 = 100 points

For example, for the 2nd question on biophysical chemistry from the question card on biophysical chemistry module:

- correct answer - 5 points

- correct explanation - 5 points
Total for one question: 10 points

ORGANIC CHEMISTRY

Teachers: Prof. Liliya Nikitina
Building, Department, classroom # NUK, Department of General and Organic Chemistry, 629, 658

Contact details:
Telephone number: 89033075070 (Prof. Liliya Nikitina)
E-mail address: nikitl@mail.ru
Office and working hours: 633 (9-17)

Total hours — 324:
- Lectures 38 hours;
- Practical classes 145 hours;
- Independent work 105 hours;
- Exam 36 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University https://e.kazangmu.ru/course/view.php?id=2307

Course objectives: The purpose of mastering the discipline

The purposes of mastering the discipline of organic chemistry are formation of systematic knowledge of medical students about the structure and chemical transformations of low- and high-molecular organic compounds, taking part in the processes of vital activity of the human body at the molecular level, as well as mastering fundamental foundations of organic chemistry, necessary for studying other academic disciplines and acquisition of professional medical qualities (hereinafter - discipline).

Tasks of the discipline:

- study of the structure and chemical properties of the main classes of biologically important organic compounds, structure and functions of the most important chemical compounds (nucleic acids, natural proteins, water-soluble and fat-soluble vitamins, hormones, etc)
- formation among students systematic knowledge of the chemical transformations of low- and high-molecular organic compounds, taking part in the processes of vital activity of the human body
- development of the student's professional self-awareness, his ability to use the acquired knowledge in the analysis of medicinal products of organic nature and in the research activities of the future specialist.

Course topics:

I semester

Calendar plan of lectures

1. Types of chemical bonds in organic compounds. Delocalized chemical bond. π-,π- and p, π – conjugation.
2. Mutual influence of atoms in molecules of organic compounds and ways of its transfer. Inductive effect. Mesomeric effect.
3. Types of reactions and reagents in organic chemistry.
4. Mechanisms of organic reactions, their relationship with the electronic and spatial structure of reacting substances and conditions for conducting reactions.
5. Alkanes, alkenes, alkynes.
6. Aromatic compounds.
7. Alcohols and phenols.
8. Aldehydes and ketones.
9. Carboxylic acids and their functional derivatives.
10. Fats and phospholipids.

Calendar plan of laboratory classes

1. Classification and nomenclature of organic compounds.
2. Electronic structure of organic compounds. Conjugation and aromaticity.
3. Electronic effects of substituents.
4. The concept of reaction mechanisms on the example of A_E, A_N, S_E, S_N, S_R and reagents (electrophile, nucleophile, radical). Reactions of hydrocarbons.
5. Acidity and basicity.
6. Module 1.
7. Alkanes, alkenes, alkynes.
8. Aromatic compounds.
9. Alcohols and phenols.
10. Aldehydes and ketones.
11. Module 2. Laboratory work on topics 7-10.
12. Carboxylic acids and their functional derivatives.
13. Fats and phospholipids.
14. Module 3. Laboratory work on topics 12-13.

II semester

Calendar plan of lectures

1. Stereoisomerism, optically active compounds.
2. Hydroxy- and oxoacids.
3. Monosaccharides.
4. Di- and polysaccharides.
5. Amines and aminoacids, peptides.
6. Heterocyclic compounds.
7. Nucleic acids (RNA, DNA).
8. Terpenes.
9. Steroids.

Calendar plan of laboratory classes

1. Spatial arrangement of organic compounds. Stereoisomerism.
2. Hydroxyacids.
3. Oxoacides.
4. Monosaccharides.
5. Monosaccharides (chemical reactions).
6. Di- and polysaccharides.
7. Module 4. Laboratory work on topics 1-6.
8. Amines and aminoacids, urea.
9. Aminoacids.
10. Heterocyclic compounds (5-membered cycles).
11. Heterocyclic compounds (6-membered cycles).
12. Nucleotides and Nucleic acids
13. Module 5. Laboratory work on topics 8-12.
14. Isoprenoids. Terpenes.
15. Steroids.

Text books and required supplies:

1. Zurabyan S.E. Fundamentals of Bioorganic Chemistry. – M.: GEOTAR-MED, 2003.-320 p.
2. N.Lezhava, O.Gabrichidze. An introduction to medical chemistry / Tbilisi, - 2006. – 292 p.
3. L.E. Nikitina, I.V. Fedyunina. An introduction to bioorganic chemistry. For English-speaking students of the faculty of general medicine / Kazan: KSMU, 2013. — 70 p.
4. L.E. Nikitina, I.V. Fedyunina. Manual on laboratory classes on bioorganic chemistry course *for English-speaking students of the faculty of general medicine.* / Kazan: KSMU, 2016. — 46p.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework

the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Examples of module No. 1 questions

1. Which of the following systematic nomenclature corresponds to CH_3-CH_2-CH(OH)-CH_2-CH_2-COOH
a. 3-oxyhexanoic acid
b. 4-oxyhexanoic acid
c. 3- oxyhexanal
d. 4- oxyhexanal

2. Which of the following systematic nomenclature corresponds to CH_3-CH_2-CH(OH)-CH(SH)-CH_2-COOH
a. 3-oxy-4- mercaptohexanoic acid
b. 4-oxo-3- mercaptohexanal
c. 2-amino-4- sulfohexanoic acid
d. 4-oxy-3- mercaptohexanoic acid

3. The suffix -one is contained in the systematic names of compounds containing

a. carbonyl group
b. carboxyl group
c. double C = C bond
d. hydroxyl group

4. Which of the following systematic nomenclature corresponds to CH_3-$CH(C_2H_5)$-CH_2-$CH(OCH_3)$-CH_2OH
a. 2-ethyl-4-methoxy-pentanol-5
b. 2-methoxy-4-ethyl-pentanol-1
c. 2-methoxy-4-methylhexanol-1
d. 2,4-dimethylhexanol-1
5. Which of the following systematic nomenclature corresponds to $HSCH_2$-$CH(C_2H_5)$-$CH(OH)$-CH_2-$CH=O$
a. 5-sulfo-4-ethyl-1-oxo-pentanol-3
b. 3-hydroxy-5-mercapto-4-ethylpentanal
c. 5-oxo-3-hydroxy-4-ethyl-pentanethiol-1
d. 4-ethyl-3-hydroxy-5-mercaptopentanal

Examples of module No. 2 questions

1. Which of the following compounds is the most reactive in nucleophilic addition reactions?
a. trichloroacetic aldehyde
b. acetaldehyde
c. acetone
d. formaldehyde

2. Which of the following compounds oxidation forms methyl ethyl ketone?
a. butanol-1
b. propanol-1
c. propanol-2
d. butanol-2

3. Which of the following groups is contained in phenylhydrazone?
a. $C=N-NH_2$
b. $C=N-NH-C_6H_5$
c. $C=NH-R$
d. $C=N-OH$

4. Which of the following compounds prohibits the reaction of aldehyde oxidation?
a. $Cu(OH)_2$
b. O_2
c. H_2
d. Ag_2O

5. Aldol condensation is a reaction between:

a. 2 molecules of aldehyde without a hydrogen atom at C-2
b. 2 ketone molecules without a hydrogen atom at C-2
c. 2 ketone molecules with a hydrogen atom at C-2
d. 2 molecules of aldehyde with a hydrogen atom at C-2

Examples of module No. 3 questions

1. Which of the following alcohol components exist in fats and phospholipids?
a. ethylene glycol
b. sorbitol
c. glycerol
d. butantriol-1,2,4

2. How many molecules of H_2 are required to convert trilinolein to tristearin?
a. 3 molecules of H_2
b. 6 molecules of H_2
c. 4 molecules of H_2
d. 5 molecules of H_2

3. Which of the following is solid at room temperature?
a. dilinolenopalmitin
b. triolein
c. palmitodystearin
d. oleodilinolein

4. Which of the following form when an excess of hot KOH acts on triolein?
a. glycerin and oleic acid
b. glycerin and potassium oleate
c. potassium glycerate and oleic acid
d. potassium glycerate and potassium oleate

5. Which of the following acids are not considered higher fatty acids?
a. linoleic acid
b. benzoic acid
c. palmitic acid
d. oleic acid

Examples of module No. 4 questions

1. Which of the following compounds does not represent monosaccharides?
a. cellobiose
b. glucose
c. ribose
d. galactose

2. Which of the followings appears during the reaction of α-ribofuranose with isopropyl alcohol?
a. α-isopropylribofuranoside
b. β-isopropylribopyranoside
c. α-isopropylribopyranoside
d. β-isopropylribofuranoside

3. Which of the followings appears during the reaction of glucose with Ag $(NH_3)_2OH$?
a. mixture of several acids
b. glucaric acid
c. gluconic acid
d. glucuronic acid

4. Which of the followings appears during the reaction of glucose with bromine water?
a. gluconic acid
b. galactaric acid
c. galactonic acid
d. glucaric acid

5. Which of the following processes occurs during the reaction of ribofuranose with one molecule of H_3PO_4?
a. phosphorylation of all hydroxyls in a ribose molecule
b. hydroxyl phosphorylation at C(5) in ribose
c. hydroxyl phosphorylation at C (2) and C (3) in ribose
d. hemiacetal hydroxyl phosphorylation in ribose

Examples of module No. 5 questions

1. 2,3-Dioxipropanoic acid is formed by the interaction of serine with
a. HNO_2
b. HNO_3
c. C_2H_5OH
d. HCOOH

2. Litmus turns blue in the solution of
a. phenylalanine
b. glutamic acid
c. lysine
d. alanilleucine

3. Lactic acid is formed by the interaction of alanine with
a. CH_3OH
b. CH_3COOH
c. HNO_3
d. HNO_2

4. Aminoacetic acid forms a salt in reaction with
a. glycerin
b. nitrous acid
c. hydrogen chloride
d. ethanol

5. The aromatic amino acid among the following compounds is
a. tyrosine
b. proline
c. valine
d. cysteine

EVALUATION OF ANSWER
of Modules

The ticket of the module consists of 10 tasks. Questions are evaluated by 10 points.
Total: 10 x 10 = 100 points
Examples of exam questions

1. Which of the following systematic nomenclature corresponds to CH_3-CH_2-CH(OH)-CH_2-CH_2-COOH
a. 3-oxyhexanoic acid
b. 4-oxyhexanoic acid
c. 3- oxyhexanal
d. 4- oxyhexanal

2. Which of the following compounds is the most reactive in nucleophilic addition reactions?
a. trichloroacetic aldehyde
b. acetaldehyde
c. acetone
d. formaldehyde

3. Which of the following alcohol components exist in fats and phospholipids?
a. ethylene glycol
b. sorbitol
c. glycerol
d. butantriol-1,2,4

4. Which of the following compounds does not represent monosaccharides?
a. cellobiose
b. glucose
c. ribose
d. galactose

5. 2,3-Dioxipropanoic acid is formed by the interaction of serine with

a. HNO_2
b. HNO_3
c. C_2H_5OH
d. HCOOH

EVALUATION OF THE EXAM ANSWER

The question card of the exam consists of 25 test questions. Each question on exam is evaluated by 4 points, and there is only one correct answer for each one. In case of wrong answer student receives 0 point.
Total for one question: 4 points. Total: 4 x 25 = 100 points.

PHYSICAL AND COLLOIDAL CHEMISTRY

Teachers: DSc Liliya Nikitina, Ilmir Gilfanov
Building, Department, classroom: NUK, Department of General and Organic Chemistry, 629, 654

Contact details:
DSc Liliya Nikitina:
Telephone number: 89033075070
E-mail address: nikitl@mail.ru
Office and working hours: 633, 9 am – 5 pm
Ilmir Gilfanov:
Telephone number: 89173970834
E-mail address: ilmir.gilfanov@gmail.com
Office and working hours: 635, 9 am – 5 pm

Total hours — 216 hours:
Lectures 32 hours;
Practical classes 90 hours;
Independent work (self-study) 58 hours;
Control 36 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.

Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=2703).

Course objectives:
Physical chemistry focuses on the properties and structure of substances, the physical mechanism of interaction between their atoms and molecules, and the conditions under which chemical reactions occur. The goals of mastering the physical chemistry are to predict the course of a chemical process and its outcome under various conditions based on knowledge of the structure and properties of the substances involved, and to acquire professional pharmaceutical qualities (hereinafter — discipline).

Tasks of the discipline are to:
develop knowledges in the fundamentals of physical and colloidal chemistry, the phase equilibria and transitions, the surface phenomena, including application of them used in medicine and pharmacy;
introduce students with the principles of organization of a chemical laboratory;
acquire skills in performing work in a chemical laboratory using special equipment and operations used in the preparation of drugs;
develop understanding on the physicochemical aspects of drug preparation processes, including the factor of stability and interactions can occur within it.

Course topics:
Calendar plan of lectures
3rd semester

1. Fundamentals of chemical thermodynamics: basic concepts, essence and research methods; first, second and third laws of thermodynamics. Calorimeters: device, application.
2. Fundamentals of chemical kinetics: basic concepts, essence and research methods; molecularity, order, constant and classification of reactions, methods for determining the order of a reaction; Michaelis-Menten equation, enzyme catalysis.
3. Fundamentals of photochemistry: basic concepts and essence; spectral methods.
4. Phase equilibria and transitions: basic concepts and essence; phase transitions of the first and second order; phase diagram, number of degrees of freedom and Gibbs's phase rule.
5. Colligative properties of solutions: ideal solutions, Raoult's law, vapor pressure and boiling point, ebullioscopy constant of a solution. Separation of unlimitedly soluble liquids: basic concepts and essence, boiling phase diagram, Konovalov's first and second laws, rules of distillation; boiling point of a mixture of liquids, vapor composition, condensation temperature on the phase diagram.
6. Colligative properties of solutions: diffusion and osmosis. Solutions of mutually insoluble liquids: distribution coefficient, Nernst's law, supercritical fluid extraction, single and continuous extraction, mass of extracted substance, extractors; polarity and non-polarity.
7. Colligative properties of solutions: crystallization temperature, cryoscopy constant of the solution. Crystallization: basic concepts and essence of the method, phase diagram of

crystallization, conditions for crystal growth. Diffraction methods of analysis: essence of methods, X-ray diffraction analysis, powder diffraction, small-angle X-ray scattering method.

8. Sublimation: basic concepts, characteristics and essence, phase diagram of sublimation, heat of sublimation, conditions and reasons for sublimation, process and stages of sublimation, justification of the method.

4th semester

1. Surface phenomena: molecular pressure, surface tension, Gibbs's surface energy, laws; polarity and non-polarity, polarity coefficient.
2. Chromatography: basic concepts and essence of the method, classification of chromatographic methods, selectivity and efficiency of chromatography, supercritical fluid chromatography.
3. Dispersed systems: heterogeneity, dispersity, classification of dispersed systems. Methods for obtaining colloidal systems. Molecular-kinetic and optical properties of colloidal systems: diffusion, Brownian motion, osmotic pressure, light scattering, sedimentation (basics of centrifugation).
4. Macromolecular compounds: basic concepts, classification, structure of high-molecular compounds, causes of abnormally high viscosity and stability of solutions of high-molecular compounds.
5. Gels: basic concepts, essence, structure, classification and properties of gels, gelling agents, application of gels.
6. Surfactants: adsorption on a liquid surface, surface activity, Duclos-Traube's rule, properties and applications of surfactants.
7. Microheterogeneous systems: basic concepts, nature, properties and stability factors of aerosols, powders, suspensions, emulsions, foams; sedimentation analysis.
8. Fundamentals of supramolecular chemistry: basic concepts, essence, objects of research, concept of molecular recognition, intermolecular bonds, supramolecular compounds, supramolecular machines.

Calendar plan of laboratory classes

3rd semester

1. Instruction on safety rules when working in a chemical laboratory. Introduction to physical and colloidal chemistry: subject, goals and objectives of mastering the discipline.
2. Fundamentals of chemical thermodynamics: enthalpy, thermal effect of a chemical reaction, thermochemistry and Hess's law; entropy, Gibbs's energy and spontaneous processes; energy diagram of a chemical reaction. Performing laboratory work "Determination of the heat of dissolution of a known salt. Determination of the heat of neutralization."
3. Fundamentals of chemical kinetics: rate of a chemical reaction, factors affecting the rate of a chemical reaction, Van't Hoff's rule; half-life, catalysis, active collision theory, activation energy, transition state theory, catalysts, influence of a catalyst on the rate of a chemical reaction; chemical equilibrium and its displacement, chemical equilibrium constant. Le Chatelier's principle. Performing laboratory work "Studying the dependence of the rate of a chemical reaction on various factors. Heterogeneous catalysis. Shift in chemical equilibrium."
4. Fundamentals of photochemistry: the principle of a photochemical reaction, the laws of photochemistry; fluorescence and phosphorescence, fluorescence quantum yield,

fluorimetry; fluorescent label. Performing laboratory work “Luminol-dependent chemiluminescence. Dependence of the rate of photochemical reaction of luminol on the catalyst concentration.”

5. Ionic equilibria in aqueous solutions: buffer solutions: mechanism of action, buffer capacity, acid-base balance in the body and its disorders. Colligative properties of solutions: osmotic pressure; methods for calculating isotonic concentrations of solutions based on gas laws, according to Raoult’s law and the pharmacopoeial method; physiological solutions. Performing laboratory work “Preparation of buffer solutions. Effect of dilution on the pH of buffer solutions. Buffer action and determination of buffer capacity."
6. Fundamentals of electrochemistry: electrical conductivity of electrolyte solutions, conductometric methods of analysis, conductometric titration; electrochemical systems, galvanic circuits, classification and mechanism of operation of electrodes, electrode potentials, electromotive force, redox potentials, potentiometric methods of analysis, potentiometric titration. Performing laboratory work “Potentiometric measurement of pH of solutions. Potentiometric titration".
7. Module on topics 1-6.
8. Phase equilibria and transitions: triple and critical points on the phase diagram, supercritical phase (fluids). Thermal analysis: cooling curves and fusibility diagram, eutectic mixtures. Performing laboratory work “Eutectic formation”.
9. Separation of unlimitedly soluble liquids. Distillation: rules, azeotropic mixture; simple distillation, azeotropic distillation, fractional distillation, steam distillation, vacuum distillation; rotary evaporators. Performing laboratory work “Distillation”.
10. Solutions of mutually insoluble liquids. Extraction: essence, extractants, requirements for them; solid-liquid and liquid-liquid extraction, driving force and extraction mechanism; factors accelerating and increasing the efficiency of extraction; nonpolar and polar aprotic and protic solvents; solubility of organic compounds, extraction dosage forms. Performing laboratory work “Extraction”.
11. Crystallization and fundamentals of crystallography: driving force and crystallization mechanism, crystallization methods, recrystallization technique, choice of solvent; crystal, single crystal, polycrystal, crystal packing and symmetry; polymorphism of inorganic and organic compounds, essence, research methods; diffraction methods of analysis. Performing laboratory work “Purification by recrystallization. Microscopic study of crystal structure."
12. Sublimation. Lyophilization: sublimation and desublimation, a device for carrying out sublimation, factors accelerating and increasing the efficiency of sublimation, sublimation in a vacuum; freeze drying and lyophilization, dosage forms lyophilizates. Performing laboratory work “Cleaning by sublimation.”
13. Physicochemical analysis: determination of the melting point: the essence of the method, melting and decomposition temperatures, melting of amorphous, crystalline and mixtures of substances, methods for determining the melting point by the capillary method, sample preparation, measurement modes. Polarimetry: essence of the method, optical activity, polarized light, reasons for determining the angle of rotation of the plane of polarized light, polarimeter, specific angle of rotation and optical purity. Performing laboratory work “Determination of the identification and purity of substances by melting point. Polarimetric determination of the concentration of a substance in solution."

14. Performing student educational research work №1 “Physical organic chemistry”: synthesis, isolation, purification, identification and determination of the purity of organic compounds.
15. Module on topics 8-14.

4th semester

1. Surface phenomena: wettability, contact angle; adhesion and cohesion; methods for reducing surface tension, general characteristics of sorption processes.
2. Surface phenomena: sorption mechanisms, absorption and adsorption, desorption, adsorption equilibrium, adsorption on a solid surface, physical, chemical, polar, molecular adsorption; hemosorption and plasmasorption. Performing laboratory work “Adsorption on a solid surface and elution. Influence of temperature on physical adsorption rate.”
3. Chromatography. mobile and stationary phases, elution, isocratic and gradient elution, normal-phase and reverse-phase chromatography, ion exchange chromatography, gel filtration, thin layer chromatography, column chromatography; application of chromatography in medicine and pharmacy. Performing laboratory work “Thin layer chromatography. Column adsorption chromatography”.
4. Lyophobic colloidal systems: basic concepts, methods of preparation and purification; molecular kinetic properties: nephelometry, ultramicroscopy; hemodialysis and sterilization by filtration. Performing laboratory work “Preparation and purification of lyophobic colloidal systems”.
5. Lyophobic colloidal systems: the structure of a colloidal particle, electric double layer theories, electrothermodynamic and electrokinetic potentials; electrokinetic properties: electrophoresis and electroosmosis. Performing laboratory work “Determination of the charge of a colloidal particle”.
6. Lyophobic colloidal systems: stability and coagulation of colloidal systems, Schultz-Hardy rule, mechanisms, theories and kinetics of coagulation, colloidal protection, protective number. Performing laboratory work “Determination of the coagulation threshold. Colloidal protection”.
7. Module on topics 6-7.
8. High-molecular compounds: methods of preparation and properties of macromolecules, dissolution and properties of solutions of high-molecular compounds, swelling, degree of swelling, viscosity of solutions and viscometry; isoelectric point, salting out. Performing laboratory work “Radical polymerization-condensation reaction. Viscometric determination of the molecular weight of polyethylene glycol. Determination of the isoelectric point of casein”.
9. Gels: methods of gels preparation, factors influencing on the formation of gels, Liesegang rings, thixotropy, syneresis of gels. Gelatin: preparation, structure, properties, application. Performing laboratory work “Swelling and dissolution of gelatin. Preparation of gels. Rings of the Liesegang”.
10. Surfactants: structure, classification and compatibility of surfactants; micellar colloidal systems (semi-colloids), critical concentration of micellization, micelle structure, solubilization. Performing laboratory work “Stallagmometric analysis”.
11. Microheterogeneous systems: structure and methods for producing aerosols, powders, suspensions, emulsions and foams. Performing laboratory work “Microheterogeneous systems”.

12. Performing student educational research work №2 "Preparation and study of the stability of gels and direct emulsions".
13. Fundamentals of supramolecular chemistry: supramolecules and supramolecular assemblies, structure, mechanism of formation, intermolecular bonds, supramolecular interactions and objects in biology, medicine and pharmacy; bioavailability and pharmaceutical availability. Performing laboratory work “Fundamentals of supramolecular chemistry”.
14. Performing student educational research work №3 "Supramolecular interactions in dosage forms".
15. Module on topics 8-14.

Text books and required supplies:

1. Fedyunina I.V. An introduction to physical and colloidal chemistry for English-speaking students of the faculty of general chemistry / Kazan: KSMU, 2011 — 78 p.
2. Fedyunina I.V. Manual on laboratory classes on physical and colloidal chemistry course for English-speaking students of the faculty of general chemistry / Kazan: KSMU, 2011 — 46 p.
3. E.Y. Mikrukova, L.E. Nikitina. An introduction to general chemistry / Kazan: KSMU, 2009. — 59 p
4. N. Lezhava, O. Gabrichidze. An introduction to medical chemistry / Tbilisi, 2006. — 292 p.
5. Bruce M. Mahan, Rollie J. Myers. University Chemistry. Fourth edition: Addison Wesley Longman. 1998. — 1076 p.
6. Peter Atkins, Julio de Paula, James Keeler. Atkins’s Physical Chemistry. 11th Edition: Oxford University Press. 2018 — 944 p.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10-point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt, the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – “poor”, 70-79 – “satisfactory”, 80-89 – “good”, 90-100 – “excellent”.

Overall student rating is built up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful;
- Be careful with equipment;
- Be disciplined;
- Be prepared for the classes;
- Be involved, do not hesitate to ask questions;
- Look professional: you have to wear clean white coat and change shoes;
- Eating is allowed only during brakes;
- Using phone is allowed only during brakes;
- Maintain the safety rules in chemical laboratory and during performing laboratory works.

Example of Module No. 1.

1. Based on the thermochemical equations $2KClO_3 \rightarrow 2KCl + 3O_2$, $\Delta H = -98.8$ kJ, $KClO_4 \rightarrow KCl + 2O_2$, $\Delta H = 33$ kJ, calculate the heat effect and determine the type of reaction $4KClO_3 \rightarrow 3KClO_4 + KCl$.

A) –296.6; B) 358.7; C) –146.1; D) 124.9.

2. Determine the heat effect of neutralization (kJ) of 150 ml of 0.2 M solution of dichloroacetic acid with 100 ml of 0.15 M solution of KOH, if the heat of the neutralization reaction is 62 kJ/mol.

A) 9.3; B) 18.6; C) 4.78; D)2.14.

3. Entropy practically does not change in the system described by the chemical equation:

A) $NH_4NO_{3(s)} \rightarrow N_2O_{(g)} + 2H_2O_{(g)}$; B) $Fe_2O_{3(s)} + 3H_{2(g)} \rightarrow 2Fe_{(s)} + 3H_2O_{(g)}$;

C) $CH_{4(g)} + CO_{2(g)} \rightarrow 2CO_{(g)} + 2H_{2(g)}$; D) $C_{(s)} + CO_{2(g)} \rightarrow 2CO_{(g)}$.

4. The chemical equilibrium in the gas-phase system $C_4H_{10} \leftrightarrow C_4H_8 + H_2 - Q$ can be shifted towards the products (→) of the reaction:

A) by increasing the temperature and decreasing the pressure; B) by increasing the temperature and increasing the pressure; C) by decreasing the temperature and increasing the pressure; D) by decreasing the temperature and decreasing the pressure.

5. Calculate the osmotic pressure (kPa) of a solution containing 135 g of glucose in 1.5 L at a temperature of 0°C.

A) 1134.315; B) 536.75; C) 2684.125; D) 214.79.

Example of Module No. 2.

1. The partition coefficient of oleic acid between chloroform and water is 0.52 at 25°C. How many grams of oleic acid can be extracted from a 100 ml 0.5 M solution of oleic acid in chloroform when shaking it once with 100 ml of water?

A) 2.89; B) 4.42; C) 1.36; D) 0.89.

2. Determine will crystallization occur if the density of the crystal nucleus is 1.002, its volume is 0.785, and its surface is 0.984. The molecular weight of the substance is 245, the interfacial

surface tension is 0.125. The chemical potential of the initial and new phases is 1.025 and 0.658, respectively:
A) yes; B) no; C) particularly; D) not enough data to solve.

3. For the purification of phthalic anhydride, a vacuum sublimation was conducted. The initial mass of the substance was 7.256 g. After sublimation, 2.154 g of anhydride was obtained. Calculate the practical yield (%) of the purified substance:
A) 29; B) 56; C) 12; D) 75.

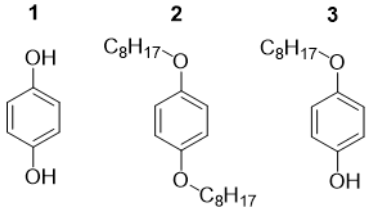
4. Indicate the number of independent components in the system: $H_2 + Cl_2 \leftrightarrow 2HCl$:
A) 1; B) 2; C) 3; D) 4.

5. Among listed compounds, identify an optically active:
A) glycine; B) menthol; C) thymol; D) 2-chloroacetic acid.

Example of Module No. 3.
1. Indicate the ions that in solution can exchange with the ion exchanger of the composition R–SO_3H:
A) F^-; B) K^+; C) Br^-; D) Cl^-.

2. The concentration of cholesterol in blood plasma after hemosorption decreased from 4.8 to 4.0 μmol/ml. What is the capacity of this adsorbent (amount of adsorption) for cholesterol (in μmol/g) if the plasma volume is 1 L, and the sorbent mass is 10 g?
A) 80; B) 50; C) 120; D) 240.

3. Suggest the order in which the elution of compounds 1, 2, and 3 (*Figure*) will occur when using a silica gel column as the stationary phase and pentane as the mobile phase.



A) 123; B) 132; C) 231; D) 321.

4. Determine the magnitude of the electrokinetic (zeta-) potential (mV) if under a voltage of 100 V the boundary of the stained sol moved 1 cm in 10 minutes. The distance between the electrodes is 10 cm, the dielectric permittivity of vacuum $\varepsilon_o = 8.85 \cdot 10^{-12}$ F/m, the relative dielectric permittivity of the medium $\varepsilon = 81$, the viscosity of the dispersion medium is 0.001 Pa·s:
A) 23; B) 14; C) 9; D) 31.

5. Determine the average displacement (m) of a sol particle in 15 seconds at a temperature of 20°C, if the particle radius is $5 \cdot 10^{-8}$ m, the viscosity of the medium is $1 \cdot 10^{-3}$ Pa·s:
A) $7.14 \cdot 10^{-6}$; B) $9.26 \cdot 10^{-6}$; C) $10.1 \cdot 10^{-6}$; D) $2.36 \cdot 10^{-6}$.

Example of Module No. 4.
1. The average molar mass of egg albumin is 44000 g/mol. Calculate the osmotic pressure (kPa) of a solution containing 10 g of albumin in 1.5 L at 25°C, given that the protein is in a neutral form:

A) 0.375; B) 0.875; C) 1.245; D) 0.142.

2. To which electrode will protein particles (IEP = 4.0) move during electrophoresis in an acetate buffer prepared from 150 ml of 0.1 M sodium acetate solution and 250 ml of 0.2 M acetic acid solution (pK = 4.75)?
A) cathode; B) anode; C) neither cathode nor anode; D) either cathode or anode.

3. Determine the maximum adsorption (mol/cm^2) of butyric acid on the surface of the solution if the cross-sectional area of its molecules is $2.22 \cdot 10^{-15}$ cm^2.
A) $3.67 \cdot 10^{-10}$; B) $7.48 \cdot 10^{-10}$; C) $8.38 \cdot 10^{-10}$; D) $1.48 \cdot 10^{-10}$.

4. The radius of the oil phase droplets in the emulsion is equal to $2 \cdot 10^{-5}$ m. Calculate the total surface area of the phase interface in 1 m^3 of a 15% emulsion, considering that the surface area of a spherical droplet is calculated using the formula $S = 2\pi r^2$, and the volume $V = (4\pi r^3)/3$.
A) 11.250; B) 14.750; C) 9.560; D) 4.250.

5. Calculate the total phase interface area in 1 m^3 of a 20% emulsion, considering that the size of spherical droplets is $2 \cdot 10^{-5}$ m.
A) 15000; B) 5000; C) 10000; D) 20000.

EVALUATION OF THE MODULE ANSWER

The question card of the modules consists of 50 test questions. Each question on module is evaluated by 1 point, and there is only one correct answer for each one. In case of wrong answer student receives 0 point. Total for one question: 1 point. Total: 1 x 50 = 50 points.

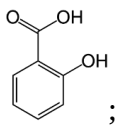
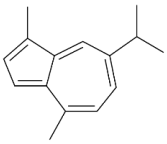
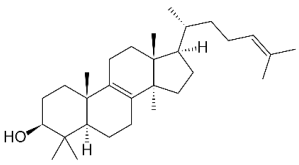
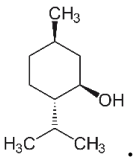
Example of Exam Ticket

1. The change in entropy is positive ($\Delta S > 0$) for the reaction:
A) $4HCl_{(g)} + O_{2(g)} \rightarrow 2Cl_{2(g)} + 2H_2O_{(g)}$; B) $Fe_2O_{3(s)} + 3CO_{(g)} \rightarrow 2Fe_{(s)} + 3CO_{2(g)}$;
C) $2CH_3OH_{(l)} + 3O_{2(g)} \rightarrow 4H_2O_{(l)} + 2CO_{2(g)}$; D) $NH_4NO_{3(s)} \rightarrow N_2O_{(g)} + 2H_2O_{(g)}$.

2. In which systems will the chemical equilibrium shift in the forward direction (→) with increasing temperature and pressure?
A) $3O_2 \leftrightarrow 2O_3 - Q$; B) $2SO_2 + O_2 \leftrightarrow 2SO_3 + Q$;
C) $2CO + O_2 \leftrightarrow 2CO_2 + Q$; D) $N_2 + O_2 \leftrightarrow 2NO - Q$.

3. The change in pressure does not shift the equilibrium in the system:
A) $H_{2(g)} + Cl_{2(g)} \leftrightarrow 2HCl_{(g)}$; B) $2NO_{(g)} + O_{2(g)} \leftrightarrow 2NO_{2(g)}$;
C) $H_{2(g)} + Se_{(g)} \leftrightarrow H_2Se_{(g)}$; D) $H_{2(g)} + Br_{2(l)} \leftrightarrow 2HBr_{(g)}$.

4. From the listed below compounds indicate one that can absorb the visible light:

A)  ; B)  ; C)  ; D)  .

5. Calculate the wavelength of the light quantum (nm) required to break the bond F_2 (ΔE = 155 kJ/mol):
A) 500; B) 470; C) 400; D) 600.

6. Determine the boiling point (°C) of a solution containing 1 g of nitrobenzene in 10 g of benzene. $E(C_6H_6)$ = 2.57, $K(C_6H_6)$ = 5.1, the boiling point of pure benzene is 80.2°C, and its freezing point is 5.4°C.
A) 82.29; B) 1.25; C) 79.81; D) 0.51.

7. Calculate the pH of a solution containing 1 g of HCOOH and 1 g of HCOOK in 500 mL. $K_a(HCOOH) = 1.8 \cdot 10^{-4}$, $pK_a = 3.75$.
A) 3.49; B) 4.78; C) 1.59; D) 2.01.

8. Determine the specific conductivity of a solution of acetic acid with a concentration of 0.16 mol/L. $K_a(CH_3COOH) = 1.81 \cdot 10^{-5}$, $\lambda_\infty(CH_3COO^-) = 35.8$ cm^2/Ohm·mol, $\lambda_\infty(H^+) = 349.8$ cm^2/Ohm·mol.
A) $6.17 \cdot 10^{-4}$; B) $3.18 \cdot 10^{-4}$; C) $4.19 \cdot 10^{-4}$; D) $1.17 \cdot 10^{-4}$.

9. The EMF of a chain composed of quinhydrone and normal hydrogen electrodes at 25°C is 0.285 V. The standard redox potential of the quinhydrone electrode is 0.699 V. Determine the pH of the solution.
A) 7; B) 6; C) 8; D) 9.

10. The characteristic viscosity of an aqueous solution of polyvinyl alcohol at 50°C is $1.11 \cdot 10^{-3}$ m^3/mol. Calculate the molecular weight (kg/mol) of the polymer if $K = 6.04 \cdot 10^{-5}$ mol/m^3, α = 0.67.
A) 86; B) 63; C) 50; D) 77.

EVALUATION OF THE EXAM ANSWER

The question card of the exam consists of 100 test questions including topics of physical chemistry (50) and colloidal chemistry (50). Each question on exam is evaluated by 1 point, and there is only one correct answer for each one. In case of wrong answer student receives 0 point. Total for one question: 1 point. Total: 1 x 100 = 100 points.

APPLIED BIOSTATISTICS

Teachers: PhD Elena N. Zhivotova, PhD Asiya R. Shajhutdinova

Building, Department, classroom # NUK, Department of Medical and Biological Physics, 509, 501

Contact details:
Telephone number: 89381530078 (PhD Elena Zhivotova)
E-mail address: elzhivotova@gmail.com
Office and working hours: 522 (9-17)

Total hours — 72:
- Lectures 10 hours;
- Practical classes 30 hours;
- Independent work 32 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=2536).

Course objectives: The purpose of mastering the discipline
The aim of achievement by pharmacy students of mastery of course Applied Biostatistics is the learning of fundamental principles of mathematics and applied mathematics necessary for the study of some others educational courses and the acquisition of professional pharmaceutical skills.

Tasks of the discipline:
To form knowledge in the field of:
statistical analysis of medical and pharmaceutical data
analysis the incoming information and deduction of the reliable data based on data obtained.

Course topics:
Calendar plan of lectures

1. Elements of probability theory and mathematical statistics. Random events and their classification. Full group of events. Classical and statistical definitions of probability. The theorem of addition of probabilities for incompatible events. The theorem of multiplication of probabilities for independent and dependent events. The formula of total probability. Repeated independent tests. Bernoulli's formula.

2. Discrete and continuous random variables. The law of distribution of a discrete quantity, the distribution polygon. Numerical characteristics of a discrete random variable, their properties. Bernoulli distribution. Normal distribution law. The rule of "three sigma". Problems of mathematical statistics. General and selective population. A typical sample. Statistical distribution of the sample, discrete and interval variational series. Polygon, histogram. Empirical probability distribution function.
3. Point estimates of the distribution parameters. The general average and average value of the sample. The general variance. Unbiased and biased estimates of the total variance: selective and "corrected" sample variance. Confidence interval for the estimation of the mathematical expectation of normally distributed random variable based on small sample data. Student's distribution. Processing and analysis of experimental data. Measurement errors and their estimates.
4. Statistical and functional dependencies. Linear correlation dependence. Linear regression equation, regression coefficients. Linear correlation coefficient, its properties. Calculation of sample linear correlation coefficient.
5. Null and competing hypotheses. Statistical criteria. Significance level. Testing the significance of a linear correlation between values. Comparison of mean values of two normally distributed populations whose variances are unknown and equal based on the results of small independent samples. Testing the hypothesis of equality of variances of two normally distributed populations based on their estimates. Fisher-Snedecor criterion. Nonparametric criteria (sign test).

Calendar plan of practice classes

1. Random events. Classical and statistical definitions of probability. The theorem of addition of probabilities for incompatible events. The theorem of multiplication of probabilities for independent and dependent events.
2. The formula of total probability. Repeated independent tests. Bernoulli's formula.
3. Random values. The law of distribution of a discrete quantity, the distribution polygon.
4. Numerical characteristics of a discrete random variable, their properties.
5. Module on topics 1-4.
6. Problems of mathematical statistics. Polygon, histogram. Empirical probability distribution function. Estimates of distribution characteristics from sample data. Point estimates of the distribution parameters.
7. Confidence interval and confidence. Estimation of the interval of confidence
8. Elements of correlation analysis. Linear correlation dependence
9. Testing of statistical hypotheses. Comparison of means of two normally distributed populations
10. Module on topics 5-9. Outcoming testing. Final test.

Text books and required supplies:

Everitt B.S. Medical Statistics from A to Z. Cambridge University Press. 2006. – 249 p.
Janet L. Peacock. Oxford Handbook of Medical Statistics. Oxford University Press. 2011. – 517 p.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of test questions

1. A hospital claims, it ambulance response time is less than 10 minutes, it can be written as:
   A. $H_0 > 10$ min, $H_A \leq 10$ min
   B. $H_0 \leq 10$ min, $H_A > 10$ min
   C. $H_0 \neq 10$ min, $H_A = 10$ min
   D. $H_0 < 10$ min, $H_A \neq 10$ min
2. n normal distribution curve, mean of the data lie on the
   A. Right end
   B. Centr

3. n normal distribution curve, mean of the data lie on the
   A. Right end
   B. Centr

Correct answer: (a)
Correct answer - 5 points.

Example of problems

1. The effect of cobalt on the weight of rabbits was studied in 2 groups of animals. During the study, the animals gave the following weight gain:

Control group, x	550	600	550	450	700	-
Test group, y	500	400	390	550	600	650

Check at the significance level p=0.05 whether the effect of cobalt on mass gain is significant.
Correct answer: *t*-statistic = 0.92; at the 0.05 level, the difference between sample mean values is not significant.
Correct answer - 5 points.

2. The toxicity of different doses of the drug X (mg/kg) was studied in white mice. The animals were observed during 10 days. Estimate the correlation between the lethality Y (%) and the dose of the drug:

X	1	4	5	8	9
Y	8	7	10	10	11

Correct answer: $r = 0.789$, strong positive correlation
Correct answer - 5 points.

EVALUATION OF THE MODULE ANSWER
The question card of the module consists of 20 tasks (12 theoretical MCQ, 4 practical MCQ and 4 numerical answer problems).
Each question is evaluated by 5 points.

LIFE SAFETY

Teachers: Prof. Ainagul Bayalieva, Assoc. Prof. PhD Alyam Dinmukhametov, assistant lecturer Timur Turaev, assistant lecturer Luay Al Hadury
Building, Department, classroom # NUK, Anesthesiology and Reanimatology, Disaster Medicine Department, Chair of Department, 5 floor, room 515,516,517,519,521,526

Contact details:
Telephone number: 8(843) 236 05 33 (Prof. Ainagul Bayalieva)
E-mail address: airmk@mail.ru
Office and working hours: 517 (9-17)

Total hours — 72:
- Lectures 10 hours;

- Practical classes 30 hours;
- Independent work 32 hours;

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (http://www.kgmu.kcn.ru:40404/moodle/login/ index.php).__

Course objectives: The purpose of mastering the discipline
mastering the discipline " Safety of life " - maintaining and ensuring the health of the population, improving the quality of life by providing qualified medical care, conducting preventive work with the population, ensuring the organization of the work of medical personnel.

Tasks of the discipline:
To form knowledge in the field of:
The tasks of mastering the discipline:
- understanding of the role and place of life safety among the fundamental and medical sciences, about the directions of development of the discipline and its achievements;
- familiarize students with the legal, regulatory, technical and organizational foundations for ensuring life safety;
- acquaint students with the principles of ensuring safe human interaction with the environment and rational conditions of activity, security systems;
- acquaint students with the features of medical support for the population in wartime and in emergency situations of peacetime;
- familiarize students with the content of measures taken to protect the population, patients, personnel and property of medical institutions in wartime and in peacetime emergency situations;
- teach students to practically implement the main measures to protect the population, patients, medical personnel and property from the damaging factors of various types of weapons and in peacetime emergency situations;
- train students to organize and carry out special processing;
- train students to use medical protective equipment in a qualified manner;
- form students' skills of a healthy lifestyle, labor organization, safety rules and monitoring of environmental safety;
- form culture of professional safety, the ability to identify hazards and assess risks in the field of their professional activities;
- form motivation and ability to independently improve the level of safety culture.

Course topics:

Calendar plan of lectures

1. Methodological and legal foundations of human life safety.
2. National security.
3. Emergencies. Unified State System for Prevention and Elimination of Consequences of Emergencies.
4. *Protecting a person from harmful and dangerous factors of natural and man-made origin.*
5. Fundamentals of organizing medical and psychological support for the population, medical workers and rescuers in emergency situations.
6. Life safety in medical organizations.

Calendar plan of laboratory classes

1. Methodological and legal foundations of human life safety. Legal basis for ensuring life safety in the Russian Federation.
2. Human life safety system in the Russian Federation
3. Russia's national security. The role and place of Russia in the world community. The system of national interests of Russia. Fundamentals of mobilization training and health mobilization. State material reserve for medical and sanitary purposes. Military registration and booking of medical workers.
4. Modern wars and armed conflicts. Definition and classification of wars and armed conflicts. Means of armed struggle. The damaging factors of modern types of weapons.
5. The civilian population in countering the spread of the ideology of terrorism and extremism.The security of society and the individual. Hazards and their impact on the human body. System of measures to ensure the safety of organized teams. Measures to ensure the personal safety of citizens.
6. Basic concepts, definitions, classification, medical and health consequences of emergency situations. Phases of development and damaging factors of emergency situations.
7. Methods for forecasting and assessing the situation in emergency situations. Unified State System for Prevention and Elimination of Consequences of Emergencies.
8. Module on topics 1-7
9. Basic principles and legal framework for the protection of the population. Fundamentals of the organization of rescue and other urgent work in emergency situations. The system of civil defense and the main directions of its activity.
10. Fundamentals of organization and measures to protect the population in peacetime and wartime. System and methods of human protection from the main types of dangerous and harmful effects of natural and man-made origin. Methods of control and determination of dangerous and negative factors. General characteristics and classification of protective equipment. Protective structures, individual technical and medical means of protection. Sanitary and special treatment.
11. Fundamentals of the organization of medical and psychological support for the population, medical workers and rescuers in emergency situations. The main psychological causes of erroneous actions and the occurrence of dangerous situations. Psychotraumatic factors of an emergency situation. Features of the development of neuropsychiatric disorders in the population and rescuers in emergency situations. Organization of medical and psychological assistance to the population, medical workers and rescuers in emergency situations

12. Safety of medical work. Characteristics of threats to the life and health of medical workers. The system of labor protection and safety in medical organizations. The main approaches, methods and means of ensuring the safety of the doctor. Features of ensuring fire, radiation, chemical, biological and psychological safety of medical personnel. Safety requirements when working in structural units of medical organizations. Security of medical services. Characteristics of threats to life and health of hospital patients. Forms of manifestation of threats to patient safety. The system for ensuring patient safety in medical organizations.Therapeutic and protective mode of work of medical organizations. Sanitation of patients. Evacuation of patients in emergency situations
13. Module on topics 8-12
14. Outcoming testing. Final test

Text books and required supplies:

Main

1. Kolesnichenko, P. L. Life safety: textbook / P. L. Kolesnichenko. - Moscow: GEOTAR-Media, 2019. - 544 p. – ISBN 978-5-9704-5194-6. - Text: electronic // EBS "Student Consultant" : [website]. – URL: https://www.studentlibrary.ru/book/ISBN9785970451946.html (date of access: 11/30/2021). – Access mode : by subscription.

Additional

1. Modern means of armed struggle: a textbook for medical students / [compiled by: M. I. Kovalev,
2. G. F. Ziganshin]. – Kazan: KSMU, 2010. – 34 p.
3. Dinmukhametov, A. G. Medical means of prevention and assistance in case of chemical and radiation injuries: study guide / A. G. Dinmukhametov. - Kazan: KSMU, 2009. - 86 p.
4. Technical means of individual protection: textbook / [compiled by A. G. Dinmukhametov]. - Kazan: KSMU, 2008. - 57 p.

Internet resources

1. Electronic catalog of the Scientific Library of Kazan State Medical University http://e-library.kazangmu.ru/cgi-bin/irbis64r_plus/cgiirbis_64_ft.exe?C21COM=F&I21DBN=IBIS_FULLTEXT&P21DBN=IBIS&Z21ID=&S21CNR=5
2. Electronic library system of KSMU https://lib-kazangmu.ru/
3. Electronic library system "Student Advisor" http://www.studentlibrary.ru
4. Scientific electronic library eLibrary.ru http://www.elibrary.ru
5. Reference legal system "ConsultantPlus" Access from library computers.
6. Medline is a medical abstract-bibliographic database/search system. The PubMed system provides access to Medline. PubMed documents medical and biological articles from the specialized literature, as well as links to full-text articles, if they are available on the Internet. PubMed contains abstracts from the following areas: medicine, dentistry, general health, psychology, biology, genetics, biochemistry, cytology, biotechnology, biomedicine, etc.) https://www.ncbi.nlm.nih.go

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

1. Be respectful
2. Be careful with equipment
3. Be disciplined
4. Be prepared for the classes
5. Be involved, do not hesitate to ask questions
6. Look professional: you have to wear clean white coat and change shoes
7. Eating is allowed only during brakes
8. Using phone is allowed only during brakes

ATTENDANCE REQUIREMENTS

- Attendance will be recorded in lecture and seminar journals.
- In case of illness or other reasons for which you will not be able to attend classes, you must notify the dean's office and department, provide a medical certificate or permission from the dean's office to miss classes for a good reason. Working off the missed lectures can be carried out on the educational portal. Your tutors will give you specific deadlines for reopening resources. Working off missed seminars will require the fulfillment of all types of practical tasks provided for by the discipline program in these classes.
- Students who missed more than 50% of classes will have to retake the discipline.

- Students who believe that the assessment of his work was affected by extraordinary circumstances can write a reasoned explanation to the head of the department or to the dean's office.

CURRENT CONTROL
Requirements for current control
Level 1 - knowledge assessment
To evaluate learning outcomes in the form of knowledge , the following types of control are used:
– tests
Example of test tasks
Territorial subsystems of the RSChS are created to prevent and eliminate emergencies
= in the constituent entities of the Russian Federation within their territories
~in cities and districts
~in towns and cities
~ at industrial facilities

Criteria for evaluation
The mark on the test is set in proportion to the proportion of correct answers:
90 - 100% - "excellent" rating;
80 - 89% - "good" rating;
70 - 79% - "satisfactory" rating.
Less than 70% of correct answers - the mark "unsatisfactory".

- test papers
Example of tests
Dynamics of development of neuropsychiatric disorders affected in emergencies in the course of professional activity.
Criteria for evaluation
"Excellent" (90 - 100 points) - the work answers the question in full, the correct interpretation of the terms is given, key issues are considered, the literature is correctly selected.
"Good" (80 - 89 points) - the work answers the question in full, the correct interpretation of the terms is given, the key issues of the topic are partially considered, the literature is selected correctly, but does not go beyond the recommended.
"Satisfactory" (70 - 79 points) - the work answers
the question, but not fully, the correct interpretation of the terms is given, the key issues of the topic are partially considered, the literature is selected correctly, but does not go beyond the recommended.
"Unsatisfactory" (0 - 69 points) - the work does not answer
the question posed, the terms are misinterpreted, the key issues of the topic are not touched upon, a high percentage of borrowings without references to scientific literature.

- verbal messages

Topics of reports

Natural disasters and accidents and their damaging factors.
Anthropogenic catastrophes and accidents and their damaging factors.
Man-made disasters and accidents and their damaging factors.

Criteria for evaluation

"Excellent" (90 - 100 points) - the report fully reveals the topic, the student answers all additional questions; speaks without looking at the text.
"Good" (80 - 89 points) - the report covers the topic, but requires additions, the student answers all additional questions; speaks, relying on the text, but not reading it.
"Satisfactory" (70 - 79 points) - the report covers the topic, but requires additions, the student cannot answer most of the additional questions, partially reads the text during the story.
"Unsatisfactory" (0 - 69 points) - the report does not cover the topic, the student cannot answer most of the additional questions, reads the text.

A survey is a dialogue between a teacher and a student, the purpose of which is to systematize and clarify the knowledge that students have, to test their individual abilities to master the material. Completeness of knowledge of theoretical controlled material. Ability to public communication (demonstration of public speaking skills, discussion on professional topics, knowledge of clinical guidelines materials, knowledge of professional terminology).
Passed - the student demonstrates knowledge of the material in the section, based on familiarization with the required literature and modern publications, actively participates in the discussion, gives logical, reasoned answers to the questions posed.
Not credited - lack of knowledge on the section under study, low activity in the discussion.

Level 2 - skill assessment
To evaluate learning outcomes in the form of skills , the following type of control is used:
– solving and compiling situational problems

Case study example

The victim after 6 hours was removed from the rubble in the area of an earthquake measuring 8 points on the Richter scale. The obstruction contained the lower limbs up to the middle third of the thigh. Medical assistance was provided by the sanitary squad. The victim is conscious, in contact, the condition is satisfactory, pallor of the skin is noted. Pulse 96 beats per minute. A/D 115/60 mm Hg.

Questions:
1. Specify the type of disaster.
2. List the damaging factors.
3. What is the purpose and main activities of first aid.

Criteria for evaluation
70 points or less - the content of the task is not understood, the product is inadequate to the task;
70 - 79 points - serious errors of a logical and factual nature were made, an attempt was made to formulate conclusions;
80 - 89 points - the task was completed, but one or two minor errors of a logical or factual nature were made, conclusions were drawn;

90 - 100 points - the task is completed, conclusions are drawn.

Types of case studies and case studies:
tasks to establish the correct sequence, interconnectedness of actions, clarify the influence of various factors on the results of the task;
establishing a sequence (describe the algorithm for performing an action);
finding errors in the sequence (determine the correct version of the sequence of actions);
indicate the possible influence of factors on the consequences of the implementation of the skill, etc.

Level 3 - Skills Assessment
To assess learning outcomes in the form of skills , the following types of control are used:
- assignments for decision-making in a non-standard situation (situations of choice, multi-alternative solutions, problem situations)

Example
There was a breakthrough of the dam of the Cheboksary hydroelectric power station.
Requirements for the task : scientific reasoning, knowledge of the relevant terminology, links to the acquired knowledge.
In the case of the task from the example, the correct answer will be: "According to the classifications and methods of calculation, the breakthrough wave will reach the city of Kazan."
- assignments for assessing the consequences of decisions made

Example
There was a local accident at a nuclear power plant.
Requirements for the task : scientific reasoning, knowledge of the relevant terminology, student's awareness of various approaches to the problem and what methods of preventing thyroid lesions and RV lesions are currently accepted by the scientific community. In the case of the task from the example, the correct answer would be: "Prevention with iodine-containing drugs, adaptogens and evacuation of the population from the alleged contamination zone."

- tasks for evaluating the effectiveness of the actions

Example
Algorithm for the actions of management and staff in case of a threat by phone about mining a shopping center.
Requirements for the task : scientific reasoning, knowledge of the relevant terminology, a systematic approach to the problem.
In the case of the task from the example, the correct answer will be: “An emergency mode is being introduced. An emergency evacuation of visitors and all staff is underway. Inspection of the territory of the facility by law enforcement agencies.

Evaluation criteria for all three types of assignments
"Excellent" (90 - 100 points) - the answer is correct, scientifically argued, with links to the topics covered.

"Good" (80 - 89 points) - the answer is correct, scientifically argued, but without reference to the topics covered.
"Satisfactory" (70 - 79 points) - the answer is correct, but not scientifically argued, or the answer is incorrect, but an attempt is made to substantiate it from alternative scientific positions covered in the course.
"Unsatisfactory" (0 - 69 points) - the answer is incorrect and not scientifically substantiated.

INTERIM CERTIFICATION

1. The discipline "Life safety" ends with an intermediate certification in the form of a test.
2. The account includes:
3. The presence of passed tests on all topics and the final test.
4. The student must have 100% attendance of both lectures and practical classes or work them out by the end of the course of the discipline.
5. During the passage of the discipline, the student in the journal of practical exercises should have at least 3 marks:
6. The answer is evaluated during the survey,
7. Protection of the abstract message,
8. Answer during the analysis of a situational problem.
9. Providing an intermediate grade for completing the course.

PHYSIOLOGY WITH THE BASICS OF ANATOMY

Teachers: PhD Telina Evelina Nicolaevna, PhD Martinov Alexandr Vladimirovich, Nagiev Kerim Kazbekovich
Building, Department, classroom # Universitetskaya, 13, Department of Normal Physiology, 310 - 315
Contact details:
Teacher - telephone number: 89600365142 (PhD Telina Evelina Nicolaevna)
E-mail address: evelinatelina@mail.ru
Lecturer - telephone number: 89600365142 (PhD Telina Evelina Nicolaevna)
E-mail address: evelinatelina@mail.ru
Office and working hours: Universitetskaya, 13, 325, 327 (9-17)

Total hours – 252 h:
Lectures: 38 h;
Practical classes: 102 h;
Independent work – 76 h;
Control – 36 h

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.

Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University https://e.kazangmu.ru/enrol/index.php?id=1919

Course objectives: The purpose of mastering the discipline

The goals of mastering the Physiology with the Basics of Anatomy discipline are formation of systematic knowledge about the vital functions of the whole organism and it's individual parts and the mechanisms of their regulation in interaction with each other and with environmental factors, on the physiological bases of research methods used in the functional diagnosis and the study of body functions; formation the skills of interpretation of basic physiological principles and basic methods of physiological functions examination, which submitted to the activities of the all organism systems.

Tasks of the discipline:

To form knowledge in the field of:

the basic physiological principles, which submitted to the activities of the all organism, it's systems, tissues and cells;

the common biological mechanisms of regulation of the vital activity of the human, that providing the adaptation, homeostasis and health care;

formation of the skills with the educational and scientific literature by themselves, acquaint with a basic methods of physiological functions examination;

Course topics:

Section 1. Membrane Physiology, Nerve and Muscles,
Section 2. The Central Nervous System.
Section 3. The Sensory System.
Section 4. The Heart and Circulation.
Section 5. The Blood.
Section 6. The Respiratory System.
Section 7. The Digestive System.
Section 8. The Urinary System.
Section 9. The Endocrine System.

Calendar plan of lectures

I semester

1. The biological membrane. Transport through the cell membrane.
2. Physiology of the skeletal and smooth muscles.
3. Mechanisms of transmission in synapses.
4. General principles of coordination of body functions by central nervous system.

5. Functions of the spinal cord, medulla oblongata, pons, midbrain.
6. Functions of diencephalon. Autonomic nervous system.
7. The Sensory System. Perception.
8. Morphological and functional features of the organization of the heart.
9. Cardiac cycle. ECG.

II semester

1. Physiology of blood vessels. Arterial pulse. Venous pulse. Microcirculation.
2. Arterial pressure regulation.
3. The role of the blood in maintaining homeostasis. Red blood cells. Hemoglobin.
4. White blood cells. Immune system.
5. Hemostasis.

III semester

1. The respiratory physiology.
2. The gastrointestinal system. Digestion in the oral cavity, stomach.
3. Digestion in the small, large intestine.
4. Kidney Structure and Function.
5. Physiology of the Endocrine system.

Calendar plan of practical classes

1. Physiology of the excitable cells. The cell membrane structure. Basic mechanisms of passive and active transport (the concentration difference, diffusion, ionic pump, secondary active transport).
2. Membrane potential. Equilibrium K+ potential. Microelectrode and patch-clamp methods. Action potential. The phases of action potential. The threshold. The refractory period. The «all-or-none» law. The phenomenon of accommodation. The strength-duration curve.
3. Physiology of the skeletal and smooth muscles. Structure, morphological (sarcomere) and physiological (motor units) units of skeletal muscles. Excitation-contraction coupling. Cross-bridges formation. Role of the calcium ions and ATP in the mechanism of muscle contraction. Rigor mortis.
4. Morphological and physiological features of the nerve fibers. Propagation of the action potential along myelinated and unmyelinated nerve fibers. The laws of propagation of AP. The neuromuscular junction. Releasing of acetylcholine from axon terminals. The “end-plate potential” and excitation of the skeletal muscle fiber. Role of cholinesterase Pre- and postsynaptic mechanisms of the effects of the biological active drugs.
5. Ionotropic and metabotropic receptors.
6. Module on topics 1-5.
7. The main functions of central nervous system CNS. Neuronal theory of CNS structure. Interneuronal synapses. Neurotransmitters in CNS. Excitation and Inhibition in CNS. The neural centers (occlusion, spatial facilitation, convergence, divergence, reverberation). Reflex arch.
8. Reflexes of spinal cord. The vital centers of the medulla oblongata: vasomotor center, cardiac control center, respiratory center. Reflexes of medulla oblongata. Static and

statokinetic reflexes. Midbrain. The role of Cerebellum and Basal nuclei in motor control. Clinical abnormalities of the Cerebellum.

9. The significance of the Thalamus in processing and transmission of sensory signals. The significance of the Hypothalamus in regulation of autonomic, endocrine, somatic and emotional functions. Hypothalamohypophysial system and its functional significance.
10. Structure and functions of the basal nuclei. Structure and functions of the Cerebral cortex. Motor, sensory and associative areas. Cerebral lateralization. Electroencephalogram. Clinical use of the electroencephalogram.
11. Structures and functions of the limbic system. The role of limbic system in formation of emotions, behavior and memory. Memory, and its types. classification of memories. Physiological mechanisms underlying memory formation. Sleep. Slow wave sleep and paradoxical (REM) sleep. Basic theories of sleep: role of the reticular activating system, neuronal centers, transmitters, etc.
12. Module on topics 7-11.
13. Somatosensory perception. Receptive field of sensory neuron. Touch and temperature sensitivity.
14. Thermal balance. Energy metabolism and calorimetry.
15. Physiology of the Heart. Electrical activity of the heart. The cardiac cycle. Pressure changes during the cardiac cycle. Atrioventricular and semilunar valves. Conducting tissues of the heart. Excitation - contraction coupling in cardiac muscle.
16. Intrinsic and extrinsic control of the cardiac functions. Intrinsic autoregulation of the heart (Frank-Starling law). Intracardial and extracardial reflexes. Sympathetic and parasympathetic effects.
17. Module on topics 15-16.
18. The classification of the blood vessels. Parameters of hemodynamics. The Poiseuille's equation. Blood flow in different parts of vascular bed. Laminar and turbulent blood flow. Arterial blood pressure. Blood pressure measurement. Systolic, diastolic, pulse, mean arterial pressures.
19. Arterial blood-pressure curve. Endothelial exchange processes (Starling's relationship). Exchange of fluids via capillaries and venules. Causes of edema.
20. Regulation of the circulation. Vasoconstriction and vasodilatation. Local regulation of blood flow. Neuronal and hormonal control of circulation.
21. Module on topics 18-20.
22. Composition and function of blood. plasma. Flow properties of blood. Red blood cells. The formation of blood cells.
23. White blood cells. Immune system. Nonspecific and specific immunity.
24. Blood groups: AB0 system, Rh system. Blood transfusion.
25. Hemostasis. Platelet-mediated hemostasis. Blood clotting. Fibrinolysis. Anticoagulants.
26. Module on topics 22-25.
27. Lung function, respiration. External respiration. Mechanics of breathing. Respiratory muscles. Pleural pressure. Surface tension, surfactant. Lung volumes and their measurement.
28. Pulmonary gas exchange. O_2 and CO_2 transport in blood. O_2 dissociation curve: Respiratory control.

29. Saliva (functions, production, secretion). Mechanism and control of saliva secretion. Deglutition.
30. Stomach structure and motility. Gastric juice. HCl secretion by parietal cells. Small Intestinal Function. Pancreas. Pancreatic secretions. Pancreatic enzymes. Control of pancreatic juice secretion.
31. Liver. Bile components and hepatic secretion of bile. Enterohepatic circulation of bile salts. Digestion and absorption. Large intestine, defecation. Endocrine and paracrine hormones and neurotransmitters control GI functions.
32. Kidney Structure and Function. Renal Circulation. Glomerular filtration and clearance. Transport processes at the nephron.
33. Reabsorption, excretion and urine concentration. The kidney and acid–base balance. Renin–angiotensin system.
34. Endocrine system. Humoral signals: control and effects. Hypothalamic–pituitary system. Hormonal control of blood glucose concentration. Thyroid hormones. Calcium and phosphate metabolism. Adrenal gland. Hormonal control of the menstrual cycle.

Text books and required supplies:

1. Ganong's Review of Medical Physiology. 26th Edition. MC Graw Hill. 2019. 1792p. ISBN-10: 978-1-26-012241-1.
2. Hall J. Guyton and Hall Textbook of Medical Physiology. 13rd Edition. Elsevier. 2016. 1046p. ISBN 13:9781455770052.
3. W., Boulpaep E. Medical Physiology. 3rd Edition. Elsevier. 2016. 1312p. eBook ISBN: 9780323391597
4. Educational portal course: Normal Physiology for faculty of General Medicine https://e.kazangmu.ru/course/view.php?id=1919

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, practical work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of MCQ test (one correct answer). Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of the question card of the module

Example of the question card of the module No.1. Membrane Physiology, Nerve and Muscles

1. The structure and the functions of the cell membrane. Ion channels, types, functions and mechanisms of activation.
2. Mechanism of skeletal muscle contraction.

Example of the question card of the module No.2. The Central Nervous System

1. Inhibition in CNS. Inhibitory neurons, inhibitory synapses, inhibitory postsynaptic potentials (IPSPs). Interaction of EPSPs and IPSPs at the neurons. The role of inhibition in CNS.
2. Electroencephalography. The different types of EEG waves. Clinical use of the electroencephalography.

Example of the question card of the module No.3. The Heart

1. The role of the heart in blood circulation. Systemic and pulmonary circulation. Physiological parameters of cardio-vascular system.
2. The influence of parasympathetic nervous system on heart functions. Effects of right and left vagus nerves on the heart activity.

Example of the question card of the module No.4. The Vessels

1. Blood pressure, values in different parts of vascular bed. Invasive and non-invasive methods of blood pressure measurement.
2. Local mechanisms of blood flow regulation. Myogenic autoregulation. The role of vascular endothelium in the regulation of local blood flow.

Example of the question card of the module No.5. The Blood

1. Composition of blood. Volume of blood. Hematocrit. The physical and chemical characteristics of blood. Buffer systems of blood.

2. Hemoglobin: structure, functions, types. Compounds of hemoglobin. Metabolism of hemoglobin.

Example of the question card of the module No.6. The Digestive System

1. Functions of digestive system: motility, secretion, digestion, absorption, storage, elimination.
2. Secretion of bile by the liver. Enterohepatic circulation.

Evaluation on the module answer

The question card of the module consists of 2 questions: problem cases, practical exercises, oral and written questions or their combination.

1 correct answer - 50 points

Total for module: 100 points

Evaluation of knowledge, abilities and skills

- MCQ Test

Example:

1. Activation of a sensory nerve from the muscle spindle caused contraction of the extensor muscle and relaxation of the flexor muscle. The relaxation of the flexor muscle is an example of: A. negative feedback inhibition; B. postsynaptic inhibition; C. presynaptic inhibition; D. indirect inhibition.

Correct answer: B.

Evaluation criteria: The score on the test is set in proportion of correct answers: 90-100% - score "excellent" 80-89% - score "good" 70-79% - score "satisfactory" Less than 70% of correct answers – score "unsatisfactory".

- Oral examination

Example:

"Gas exchange in the lungs and tissues"

Evaluation criteria: "Excellent" (90-100 points) – The student is fully proficient in the basic material, possesses additional information, is able to analyze physiological processes and mechanisms, reveal their significance and interrelation with other organs and systems. "Good" (80-89 points) – The student knows the basic material, but does not fully possess additional information. The answer contains minor errors in the logical sequences. "Satisfactory" (70-79 points) – The student partially owns the material, makes mistakes in terminology, logical sequences, physiological mechanisms, the significance of physiological processes and their relationship with other organs and systems. "Unsatisfactory" (0-69 points) – The student has scattered knowledge with significant errors in physiological processes and mechanisms, makes mistakes in terminology, cannot analyze the significance of physiological processes.

- Reports

Example:

"Regulation of blood pressure"

Evaluation criteria: "Excellent" (90-100 points) – the report fully reveals the topic, the student tells, practically without looking at the text and answers all additional questions. "Good" (80-89

points) – the report reveals the topic, but requires additions, the student tells based on the text, but without reading it out and answers all additional questions: "Satisfactory" (70-79 points) – the report reveals the topic, but requires additions, the student cannot answer most of the additional questions, partially reads the text during the story. "Unsatisfactory" (0-69 points) – the report does not disclose the topic, the student cannot answer most of the additional questions, reads out the text.

- Case-study

Example:

A patient suffering from anemia comes to his physician complaining of frequent bouts of gastroenteritis. A blood test reveals antibodies directed against gastric parietal cells. The anemia in this patient is attributable to hyposecretion of which gastric product? Explain the mechanism.

Correct answer: Intrinsic factor.

Evaluation criteria: "Excellent" (90-100 points) – the correct answer is given, the essence and mechanisms of physiological processes are explained, their significance for the normal functioning of organs and systems is revealed, if necessary, an analysis of physiological constants and laboratory results is given, the student uses additional information. "Good" (80-89 points) – a short correct answer is given, the essence and mechanisms of physiological processes are explained, their significance for the normal functioning of organs and systems is revealed, if necessary, an analysis of physiological constants and laboratory results is given, the student does not use additional information. "Satisfactory" (70-79 points) – a short answer to the question is given, mistakes are made, the essence of physiological processes is not explained, an incomplete analysis of physiological constants and laboratory results is given. "Unsatisfactory" (0-69 points) – an incorrect answer is given, the problem is not solved.

Example of exam ticket

Card N1

1. Which part of the ECG corresponds to ventricular repolarization? a. The P wave; b. The QRS duration; c. The T wave
2. The second heart sound is caused by: a. closure of the aortic and pulmonary valves; b. vibrations in the ventricular wall during systole; c. ventricular filling; d. closure of the mitral and tricuspid valves.
3. The main important excitatory neurotransmitter in CNS is: a. glycine; b. GABA; c. glutamate; d. acetylcholine
4. Which of these statements about hypothalamic-releasing hormones is false? a. They are synthesized in the hypothalamus; b. They are transported by portal veins to the anterior pituitary; c. They stimulate the secretion of some specific hormones from the posterior pituitary.
5. What type of nerve fiber has the highest conduction velocity? a) Autonomic fibers; b) Sensory fibers; c) Somatic motor fibers

Evaluation of exam answer

The question card of the exam (MCQ) consists of 50 questions (only one correct answer).
1 correct answer - 2 points.

Total for exam: 100 points.

MICROBIOLOGY

Teacher: Associate professor Alfiya Savinova
Building, Department, classroom # Study building #2, Department of Microbiology named after academician V.M. Aristovsky, 230
Contact details:
Telephone number: +7 904 662 61 71 (Associate professor Alfiya Savinova)
E-mail address: alfia.savinova@kazangmu.ru
Office and working hours: 230, 225; (9-17)

Total hours — 216:
- Lectures - 32 hours;
- Practical classes - 90 hours;
- Independent work - 58 hours;
- Exam - 36 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=1396)
Course objectives: The purpose of mastering the discipline
The purpose of mastering the discipline: acquisition by students of knowledge about the etiology, diagnostics, therapy and prevention of infectious diseases, the skills necessary to perform at the proper level professional duties in the development, research and microbiological control of drugs and medicinal plant materials

Tasks of the discipline:
Objectives of mastering the discipline:
- mastering knowledge of the basic properties of infectious disease pathogens, diagnostic methods,
drugs for etiotropic treatment and specific prevention
- monitoring the quality,

efficiency and safety of drugs
- monitoring the environmental situation in the
process of manufacturing drugs

Course topics:

Calendar plan of lectures

1. Subject and tasks of microbiology. Classification of bacteria.
2. Physiology of bacteria.
3. Ecology of microorganisms. Normal microbial flora of the human body.
4. Antibiotics.
5. Infection.
6. The basics of infectious immunology
7. Staphylococci. Streptococci
8. Causative agent of anthrax. Causative agent of tetanus.
9. The causative agent of syphilis. The causative agent of gonorrhea
10. The causative agent of diphtheria. Causative agents of tuberculosis
11. Enterobacteriaceae. Esherichia.
12. The causative agent of botulism.
13. Causative agents of acute respiratory viral infections. Influenza virus.
14. Causative agents of viral hepatitis.
15. The causative agents of mycoses.
16. Microbiological control of pharmacies.

Calendar plan of laboratory classes

1. Organization of a microbiological laboratory. Microscopes. Classification of bacteria. The morphology of bacteria (cocci, rods, spiral, filamentous forms, rickettsia, chlamydia, mycoplasma).
2. Simple and complex staining methods of bacteria. Study of the structure of a bacterial cell (cell wall). Gram stain
3. Morphology and structure of acid-fast bacteria. The Ziehl-Nielsen Method.
4. Volutine granules, flagella, capsule, bacterial spores. Methods for their staining.
5. Viroids. Prions. Morphology of viruses, fungi and protozoa (Toxoplasma, Plasmodium, Trichomonas). Test 1 (Topics 1-4)
6. Aseptic, antiseptic, disinfection, sterilization in pharmacy.
7. The conditions for the cultivation of bacteria. Nutrient media. Characteristics of the growth of bacteria in liquid and solid nutrient media.
8. Isolation of pure cultures of aerobes. The cultivation of anaerobes. Isolation of pure cultures of anaerobes. Studying the biochemical properties of bacteria
9. Bacteriophages. Their interaction with a bacterial cell. The practical use of bacteriophages in medicine. Genetics of microbes. Bacterial chromosome, plasmids. Mutations. Recombination in bacteria. Molecular genetic method. Fundamentals of Genetic Engineering.
10. Normal microflora of the human body. Its positive and negative role. Dysbiosis. Drugs for treatment. Test 2 (Topics 5-8)

11. The main groups of chemotherapeutic drugs. Mechanisms and spectrum of action. Antibiotics, their classification. Mechanisms and spectrum of action. Rational use, side effects. Methods for determining the sensitivity of microbes to antibiotics.
12. Characteristics of the infectious process. Types of infectious processes. Factors of pathogenicity of microbes. Basic epidemiological concepts
13. The basics of immunology. Types of immunity. Microbial antigens. The organs of the immune system. Antibodies. Classes of antibodies. The dynamics of antibody production. Hypersensitivity reactions.
14. Immunoprophylaxis and immunotherapy. Vaccines. Immune sera. Immunoglobulins. Immunomodulators
15. Serological method for the diagnosis of infectious diseases. Immunodiagnostic reactions.
16. Test 3 (Topics 9-13)
17. Staphylococcus, streptococcus, pseudomonas aeruginosa infections. Basic properties. Microbiological diagnosis. Treatment and prophylaxis.
18. The causative agents of anthrax, gas gangrene, tetanus. Main properties. Microbiological diagnosis. Treatment and prophylaxis
19. Causative agents of syphilis, gonorrhea, trachoma and genital chlamydiasis. Main
20. properties.Epidemiology. Microbiological diagnostics. Prevention and Treatment
21. The causative agent of mycoplasmosis. Main properties.Epidemiology. Microbiological diagnostics. Prevention and Treatment. Test 4 (topics 14-15, 1-2)
22. Causative agents of: diphtheria, meningococcal infection, whooping cough, tuberculosis. Main properties.Epidemiology. Microbiological diagnostics. Prevention and Treatment
23. Causative agents: tularemia, plague, Lyme disease. Main properties.Epidemiology. Microbiological diagnostics. Prevention and Treatment. Test 5 (topics 3-4)
24. Causative agents of escherichiosis, typhoid fever, dysentery. Main properties.Epidemiology. Microbiological diagnostics. Prevention and Treatment
25. Causative agents of intestinal yersiniosis, cholera, botulism. Main properties.Epidemiology. Microbiological diagnostics. Prevention and Treatment
26. Causative agents of brucellosis, leptospirosis. Main properties.Epidemiology. Microbiological diagnostics. Prevention and Treatment. Test 6 (topics 5-7)
27. Microbiological diagnosis of viral infections. Influenza viruses, mumps, measles. Rubella virus. Main properties.Epidemiology Microbiological diagnostics. Prevention and Treatment.
28. Herpes simplex viruses types 1 and 2. Varicella-zoster and herpes zoster virus. Hepatitis B, C, D, G viruses. AIDS virus. Main properties.Epidemiology. Microbiological diagnostics. Prevention and Treatment
29. Rabies virus. Hemorrhagic fever virus with renal syndrome. Poliomyelitis virus. Main properties.Epidemiology. Microbiological diagnostics. Prevention and Treatment. Basic properties
30. Hepatitis viruses A, E. Main properties.Epidemiology. Microbiological diagnostics. Prevention and Treatment. Test 7 (topics 8-11)
31. The causative agents of mycoses (dermatophytosis and candidiasis). Main properties.Epidemiology. Microbiological diagnostics. Prevention and Treatment. Causative agents of trichomoniasis, toxoplasmosis, malaria. Basic properties. Microbiological diagnostics. Prevention and Treatment

32. Microflora of plants and medicinal raw materials of natural origin. Microbiological requirements for medicinal products.
33. Sanitary and microbiological examination of pharmacies. Investigation of distilled water, dry medicinal substances, pharmaceutical utensils, inventory, hands and sanitary clothing of personnel.
34. Sanitary and microbiological study of the air environment of pharmacies. Test 8 (topics 12-15)

Text books and required supplies:

1. Zverev, V. V. Medical Microbiology, Virology, Immunology : textbook. Vol. 1 / Zverev V. V. , Boichenko M. N. - in 2 volumes. - Москва : ГЭОТАР-Медиа, 2020. - 384 с. - ISBN 978-5-9704-5607-1..
2. Zverev, V. V. Medical Microbiology, Virology, Immunology : textbook : Vol. 2. / eds. V. V. Zverev, M. N. Boichenko. - Москва : ГЭОТАР-Медиа, 2020. - 392 с. - ISBN 978-5-9704-5719-1..
3. Artamonova, M. N. Medical Microbiology, Virology and Immunology. Lecture Notes : textbook / Artamonova M. N. , Potaturkina-Nesterova N. I. , Ilyina N. A. , Nemova I. S. - Москва : ГЭОТАР-Медиа, 2021. - 352 с. - ISBN 978-5-9704-6043-6.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10-point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt, the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – “poor”, 70-79 – “satisfactory”, 80-89 – “good”, 90-100 – “excellent”.

Overall student rating is built up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Using phone is allowed only during brakes

Example of module No. 1. card

1. Spores of bacteria. Functions. Method of staining
2 Spiral bacteria morphology. Diseases, caused by these bacteria
3. Protozoa of Toxoplasma genus morphology

Example of module No. 2 card

1. Physical factors influence on microorganisms. Sterilization. Methods of sterilization: physical
2 Classification of media
3 Ecology of microorganisms. Functions of human body s normal microbial flora
4. Lytic cycle. Virulent bacteriophages
5 DNA structure

Example of module No. 3 card

1. Sources of infection and causative agents transmission ways..
2 Antibiotics – inhibitors of cell wall synthesis
3 Killed (inactivated) vaccines. Production. Practical application.

Example of module No. 4 card

Staphylococci. Taxonomy. Properties. Epidemiology. Pathogenesis of diseases
Laboratory diagnostics of gas gangrene.
Treatment and prevention of syphilis

Example of module No. 5 card

1. Causative agent of whooping cough. Taxonomy. Properties. Epidemiology. Pathogenesis of diseases
2. Laboratory diagnostics of diphtheria.
3. Treatment and prevention of tularemia

Example of module No. 6 card

1. Causative agent of cholera. Taxonomy. Properties. Epidemiology. Pathogenesis of diseases
2. Laboratory diagnostics of typhoid fever.
3. Treatment and prevention of botulism

Example of module No. 7

1. Influenza virus. Taxonomy. Basic properties. Epidemiology, pathogenesis of the disease

2. Laboratory diagnosis of hepatitis A and hepatitis E (separately)
3. Treatment and prevention of rabies.

Example of module No. 8 card

1. Causative agents of trichomonosis . Taxonomy. Properties. Epidemiology. Pathogenesis of diseases
2. Laboratory diagnostics of dermatomycoses.
3. Microbiological examination of air in pharmacies

EVALUATION OF THE MODULE ANSWER

The question card of the module consists of 3 tasks

Questions 1 - 3 are evaluated by 33,3 points

* The teacher has the right to remove from 1 to 3 points for incorrect writing of taxonomy, reactions

Total: 3 x 33,3 = 100 points

For example, for the 2nd question from the question card on second module:

- correct answer - 33 points

Total for one question: 33,3 points

Example of examination card

Choose one correct answer

Bacilli:

1. filamentous shaped
2. spiral form
3. spherical shaped
4. rod shaped

Electron microscopy uses:

1. reflected light
2. electron beam
3. light beam
4. refractive index

Lophotrichous:

1. single or tuft on both sides
2. surrounded by lateral flagella
3. single flagella on one side
4. tuft of flagella on one side

Diplococci:

1. groups of four
2. occurs in pairs
3. grape like clusters
4. occurs in chains

What is present in prokaryotes?

1. Endoplasmic reticulum
2. Mitochondria
3. Nucleus
4. Nucleoid

Peptidoglycans are found in large quantities in cell wall of:

1. Fungi
2. Gram positive bacteria
3. Gram negative bacteria
4. All of the above

Which of the following are bounded by membrane containing sterols?

1. *Candida* 2. *Staphylococcus*
3. *Mycobacteria*
4. *Mycoplasma*

Streptococcus pyogenes produces:

1. leucocidin
2. enterotoxin
3. toxic shock syndrome toxin
4. erythrogenic toxin

Which of the following terms is not associated with fungi?

1. conidia
2. hyphae
3. pellicle
4. mycelium

A protozoan may possess any of the following except:

1. cilia
2. flagella
3. hyphae
4. pseudopodia

At the end of the Gram staining procedure, Gram-positive bacteria will be:

1. green
2. blue to purple
3. orange
4. pink to red

Methods used for viral cultivation are:

1. Cell culture
2. Animal inoculation
3. Embryonated eggs
4. All of the above

Which of the following are even smaller than viruses?
1. neisseria
2. chlamydia
3. rickettsia
4. viroides

Blood agar is an example of:
1. Enrichment media
2. Enriched media
3. Selective media
4. Transport media

1% pepton alkaline water is used for:
1. *Staphylococcus*
2. *Vibrio*
3. *Salmonella*
4. *Pseudomonas*

Organisms that are ordinarily aerobic but can grow in the absence of oxygen are called:
1. Aerobes
2. Facultative anaerobes
3. Anaerobes
4. Obligate anaerobes

Mesophilic are bacteria which grow best at:
1. Less than 20 ^{o}C
2 25-40 ^{o}C
3. 55-80 ^{o}C
4. More than 80 ^{o}C

Which of the following is true for exotoxin?
1. Heat stable
2. Poorly antigenic
3. Content LPS
4. Highly toxic

For the treatment of tuberculosis using drug:
1. Acyclovir 2. Fluconazole 3. Isoniazid 4. Bacteriophage

Gram negative diplococci is:
1. *Pseudomonas*
2. *Chlamydia*
3. *Neisseria*
4. *Treponema*

Bacteria with flagella are all EXCEPT
1. *Pseudomonas*
2. *E. coli*
3 *Mycobacterium*
4. *Vibrio*

R factor is transmitted by:
1. Transduction
2. Conjugation
3. Transformation
4. Modification

Best way to sterilize metal tools is:
1. Boiling 2. UV 3 Hot air oven 4 . Formaldehyde

Maternal antibodies transferred to fetus through placenta provides
1 Artificial active immunity
2. Natural active immunity
3. Artificial passive immunity
4. Natural passive immunity

Gas gangrene is caused by:
1. *Clostridium perfringens*
2. *Clostridium tetani*
3. *Clostridium botulinum*
4. *Clostridium difficile*

Blood Tellurite media is used for:
1. *Mycobacterium tuberculosis*
2 *Corynebacterium diphtheriae*
3. *Mycoplasma pneumoniae*
4. *Yersinia pestis*

Type of light used in dark ground microscopy:
1 Dark field
2 Reflected light
3 Polarized light
4 Transmitted light

For the treatment of candidiasis using drug:
1. Penicyllin 2. Acyclovir 3. Fluconazole 4. Ribavirin

Culture media for B.pertusis is:
1. LJ medium
2. Chocolate agar

3. Wilson Blair medium
4. Bordet- Gengou medium

Vaccine is used to prevent mumps:
1. DTP
2. BCG
3. MMR
4. Salk vaccine

The condition, when bacteria are circulated in the blood, is called:
1. Bacteremia
2. Septicopyemia
3. Viremia
4. Sepsis

For the treatment of diphtheria use:
1. antitoxic serum
2. bacteriophage
3. interferon
4. toxoid

Which of the following bacterium is a non-motile, capsulated rod that grow well on ordinary media?

1. *Vibrio cholera* 2 *Neisseria*
3. *Klebsiella* 4. *Streptoccus*

Reservoir of Yersinia pestis:
1. Man 2.Pig
3. Rate flea 4. Rodents

Which one of the following is not a fungus?
1. Trychophyton
2. Candida
3. Epidermophyton
4. Plasmodium

Which of the following associations is incorrect?
a. Lyme disease and tick
b. plague and rat flea
c. malaria and mosquito
d. typhoid fever and mosquito

Lyme disease is caused by:
1. Bacteria 2. Fungus

3. Protozoa 4. Virus

RNA virus is:
1. Herpes virus 1
2. Chicken pox virus
3. Hepatitis C virus
4 Hepatitis B virus

For prophylaxis of trichomonosis is used:
A. Live vaccine
B. Safe sex
C. Inactivated vaccine
D. Toxoid

For the treatment of chicken pox is used:
1. metronidazol
2. acyclovir
3. azidotimidin
4. rifampicin

Which of the following is true for Candida?
1. Dimorphic fungi
2. Moulds
3. Yeast
4. Yeast like fungus

Vaccine is used to prevent whooping cough:
DTP
BCG
MMR
DT

Reservoir of HFRS virus:
1. Farm animals 2 . Ticks
3. Rat flea .4. Rodents

The resistance passively transferred to a recipient by the administration of antibodies is known as
1. Artificial active immunity
2. Natural active immunity
3. Artificial passive immunity
4. Natural passive immunity

Borrelia are:
1. coma shaped
2. spiral form

3. rod shaped
4. spherical shaped

Monotrichous:
1. single or tuft on both sides
2. surrounded by lateral flagella
3. single flagella on one side
4.tuft of flagella on one side
48. Endotoxins are:
1. Proteins
2. Polysaccharide
3. Lipopolysaccharide
4. Lipids

49. What classes of immunoglobulins are formed in the chronic stage of infectious disease?
1. Ig A 2. Ig G
3. Ig D 4. Ig M

50. Causative agent of tetanus forms:
1. Neurotoxin
2. Dermatoxin
3. Enterotoxin
4. Erythroginin

An example of preparation card

Preparation name: Tetanus immune globulin (TIG)	Compounds	Practical application

EVALUATION OF THE EXAM ANSWER
Evaluation of complete, comprehensive answers to the examination tasks offered to students of the specialty "Pharmacy" in the exam in the discipline " Microbiology" in %:
1. The MCQ - 80%
2. The preparation – 20%
Note: incorrect answers are evaluated depending on the completeness of presentation (below the announced percentage).
The final assessment of intermediate certification in the subject "Microbiology" is calculated by a computer program in accordance with the score-rating system for assessing students' knowledge in force at the Kazan State Medical University, taking into account the attendance of lectures and laboratory classes, grades obtained from the current academic performance monitoring, grades for modules and examination grades.

The standard of answer to a preparation card:

Preparation name	Composition	Practical use
Tetanus immune globulin (TIG)	Content antibodies against the tetanus toxin	Tetanus immune globulin is used for the treatment of tetanus. TIG also is used for emergency prophylaxis to prevent tetanus in those who have a wound.

ANALYTICAL CHEMISTRY

Teacher: Ass. Prof. Alexandra V. Sitenkova
Building, Department, classroom # Amirkhana str., 16, Institute of Pharmacy, room 433
Contact details:
Telephone number: 521-16-42
E-mail address: aleksandra.sitenkova@kazangmu.ru
Office and working hours: 426 (9-17)

Total hours — 324:
- Lectures 38 hours;
- Practical classes 145 hours;
- Independent work 105 hours;
- Control 36 hours

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=1960).

Course objectives: The purpose of mastering the discipline

The goal of mastering the analytical chemistry discipline is developing students' systematic knowledge of the theoretical foundations of chemical analysis and practical skills and abilities for its implementation.

Tasks of the discipline:

1. Acquisition of theoretical knowledge on the basic methods of analyzing the chemical composition of substances, on methods of identification and detection, determination and separation of chemical elements, their compounds, as well as methods of establishing the chemical structure of compounds.
2. Formation of the ability to organize and perform qualitative and quantitative analysis of substances using modern chemical and physicochemical methods.
3. Consolidation of theoretical knowledge on the basics of general inorganic chemistry, organic chemistry, physical and colloid chemistry, physics and mathematics.

Course topics:

Calendar plan of lectures

1. The subject and main content of analytical chemistry. Chemical analysis. Basic concepts: analysis method and technique, qualitative and quantitative analysis, pharmaceutical analysis. Analytical signs of substances and analytical reactions. Types of analytical reactions and reagents. Sensitivity of analytical reactions.
2. The theory of electrolyte solutions used in analytical chemistry. Classification of electrolytes. The total (true) and active concentration of ions in solution, the relationship between them. Activity coefficient. The ionic strength of the solution. Calculation of the activity coefficient according to the Debye-Hückel equation and from the reference book. The law of the masses and its application in analytical chemistry. The main types of equilibria used in analytical chemistry. Constants of chemical equilibrium (thermodynamic, concentration, conditional). Heterogenous equilibria in the sediment-saturated solution of sparingly soluble electrolyte. Methods for expressing the solubility of sparingly soluble electrolytes. The solubility product (product of activity) of a sparingly soluble electrolyte. Precipitation conditions for sparingly soluble electrolytes.
3. Acid-base (protolytic) equilibrium. Autoprotolysis, acidity and basicity constant, autoprotolysis constant. Calculation of pH of solutions of strong and weak acids and bases.
4. Hydrolysis of salts. Constant and degree of hydrolysis. Calculation of pH values of salt solutions undergoing hydrolysis. Buffer systems (solutions). Calculation of pH of buffer solutions, buffer capacity, factors affecting the buffer capacity. Calculation of buffer capacity.
5. Redox systems. Redox potentials. Galvanic cell. Nernst equation. Factors determin-ing the values of electronic potentials (acidity, ionic strength, concentration of components of a redox pair). The direction of the redox reaction. The depth of the redox reaction. Calculation of equilibrium constants.
6. Equilibrium in solutions of complex compounds. The stability and non-stability constants of complex compounds (general, stepwise, concentration, true, thermodynamic). Conditional stability and instability constants of complex compounds. The effect of complexation on the solubility and deposition conditions of sparingly soluble compounds used in the analysis.

7. Methods of separation and concentration of substances. Extraction. Chromatographic (non-instrumental) methods. The concept of extraction and chromatography. Chromatographic analysis methods in qualitative analysis of substances.
8. Titrimetric analysis. Basic concepts. Requirements for reactions in titrimetry. Reagents used in titrimetric analysis, standard substances, titrants. Typical calculations in titrimetric analysis. Methods for expressing concentrations in a titrimetric analysis (molar concentration, molar concentration of equivalent, titer, titer for the analyte (titrimetric conversion factor), correction factor). Calculation of the mass of a standard substance necessary for the preparation of titrant. Calculation of the concentration of titrant in its standardization. Calculation of the mass and mass fraction of the determined substance according to the results of titration. Types (methods) of titration used in titrimetric analysis (direct, reverse, indirect). Statistical processing and presentation of the results of quantitative analysis. Methods for establishing the end point of titration (visual, instrumental).
9. Types of acid-base titration (acidimetry, alkalimetry). The essence of the methods. The condition for the titration. Titrants. Their preparation, standardization. Establishment of titration endpoint. Application in pharmaceutical analysis. Acid-base titration curves. Calculation, construction and analysis of typical curves for cases of titration of strong acid with alkali, weak acid with alkali; strong or weak bases with strong acids.
10. Indicators of acid-base titration. Indication requirements. Ionic, chromophore, ion-chromophore theories of acid-base titration. The pH range of the color transition indicator. Titration indicator. Classification of indicators (by the method of application, preparation, by color, by the mechanism of the process of interaction with the titrant, by composition). Choice of indicator by titration curve. Titration of polyprotic acids. Errors of acid-base titration, their calculation and elimination. Limitation of acid-base titration in the aquatic environment. Solvents used in non-aqueous titration. The completeness of acid-base reactions in non-aqueous media. Titrants of the method, their standardization. Application in pharmaceutical analysis.
11. Classification of methods of redox titration. Conditions for redox titration. Requirements for reactions. Permanganate titration. Condition for titration. Titrant. Its preparation, standardization. The establishment of the end point of the titration. Application of the permanganometry in pharmaceutical analysis.
12. Indicators of redox titration. The classification of indicators. Redox indicators (reversible and non-reversible), the indicator color change interval. Examples of redox indicators that are often used in the analysis (diphenylamine, 1,1-phenanthranilic acid, ferroin, etc.). Curves of redox titration: calculation, construction, analysis. Indicator selection based on titration curve analysis. Potassium dichromate, · iodimetric and iodometric titration. Titrants, their preparation. Determination of the end point of the titration. Application in pharmaceutical analysis. Iodatometric, iodochlorometric, bromatometric and bromometric titration. Titrants, their preparation. Determination of the end point of the titration. Application in pharmaceutical analysis. Cerimetric and nitritometric titration. Titrants, their preparation. Determination of the end point of the titration. Application in pharmaceutical analysis.
13. Precipitation titration. Requirements for reactions. Titration curves, their calculation, construction, analysis. The influence of various factors on the titration jump (concentration of reagent solutions, sediment solubility, etc.). Indicators of the precipitation titration method: precipitation, metallochromic, adsorption. Application conditions and selection of

adsorption indicators. Argentometric and thiocyanatotometric titration. Titrants, their preparation, standardization. Variety methods argenttometry (method Mohr, Fajans, Volgard). Rodanometry. Mercurometry. Hexacyanoferrometry. Sulfatemetry. Application in pharmaceutical analysis.

14. Complexiметric titration. Complexometry. Mercurimetry. Complexonometric indicators (metallohromic indicators), the principle of their action; requirements for metallochromic indicators. Examples of metallochromic indicators (eriochrome black T, xylenol orange, etc.). Titrants of methods, their preparation, standardization. Application in pharmaceutical analysis.
15. Optical analysis methods. Classification of optical methods. Refractometric analysis method. The theoretical basis of the method. Types of refractometer. The refractive index and its dependence on various factors. Analysis of single and multicomponent systems.
16. Molecular spectral analysis in the ultraviolet and visible spectral region. The basic laws of light absorption: the law of the Bouguer-Lambert, the law of Beer, the combined law of the light absorption of the Bouguer-Lambert-Beer. Optical density and light transmission, the relationship between them. The absorption coefficient (k) and the repayment coefficient are molar and specific; the relationship between the molar coefficient of repayment and the coefficient of absorption. The concept of the origin of the electronic absorption spectra: features of the electronic absorption spectra of organic and inorganic compounds. Photocolorimetry, photoelectrocolorimetry: their essence, advantages and disadvantages, application. Spectrophotometry. The essence of the method, advantages and disadvantages, the application. Qualitative and quantitative photometric analysis. Conditions of photometric determination (choice of photometric reaction, analytical wavelength, solution concentration and thickness of the absorbing layer, use of a reference solution). Determination of the concentration of the analyte: the method of the calibration curve, the method of one standard, the determination of concentration by the molar and specific redemption ratio, the method of standard addition. Determination of the concentrations of several substances with their joint presence. Photometric analysis errors, their nature, elimination.
17. Electrochemical methods of analysis. Classification of electrochemical methods of analysis. Potentiometric analysis. The principle of the method. Determination of the concentration of the analyte in direct potentiometry (calibration method, standard additive method). The use of direct potentiometry. Potentiometric titration. The essence of the method. Potentiometric titration curves (integral, differentiated, Gran's titration curves), potentiometric titration. Polarographic analysis. General concepts, the principle of the method. Polarographic curves, half-wave potential, the relationship of the diffusion current with the concentration. Quantitative polarographic analysis, determination of the concentration of the analyte (calibration curve method, additive method, standard solution method). Amperometric titration. The essence of the method. Conditions for amperometric titration, amperometric titration curves, concept of amperometric titration with two indicator electrodes. Coulometric analysis. Principles of the method. Direct coulometry. Coulometric titration. Conditions for coulometric titration. Equivalence point indication.
18. Chromatographic methods of analysis. Ion exchange chromatography. The essence of the method. Ionites Ion exchange equilibrium. Methods of ion-exchange chromatography. The use of ion exchange chromatography.

19. Gas (gas-liquid and gas-adsorption) chromatography. The essence of the method. High performance liquid chromatography. The concept of the theory of methods. Hold options. Separation parameters (degree of separation, separation factor, number of theoretical plates). The effect of temperature on the separation. Methods of quantitative processing of the chromatogram (absolute calibration, internal normalization, internal standard).

Calendar plan of laboratory classes

1. The subject and main content of analytical chemistry. Chemical analysis. Basic concepts: analysis method and technique, qualitative and quantitative analysis, pharmaceutical analysis. Analytical signs of substances and analytical reactions. Types of analytical reactions and reagents. Interview Rules of work and safety measures in a chemical laboratory. General requirements for the implementation of laboratory work and the design of the laboratory journal. Ammonium phosphate, sulfide and acid-base classification of cations. Analytical reactions of cations of 1-3 analytical groups according to acid-base classification.
2. Sensitivity of analytical reactions. Interview The solution of problems. Systematic analysis of a mixture of cations of the first, second and third analytical groups according to the acid-base classification.
3. The theory of electrolyte solutions used in analytical chemistry. Classification of electrolytes. The total (true) and active concentration of ions in solution is the rela-tionship between them. Activity coefficient. The ionic strength of the solution. Cal-culation of the activity coefficient according to the Debye-Hückel equation and from the reference book. The law of the masses and its application in analytical chemistry. Heterogeneous equilibrium in the sediment-saturated solution of sparingly soluble electrolyte. Methods for expressing the solubility of sparingly soluble electrolytes. The solubility product (product of activity) of a sparingly soluble electrolyte. Precipitation conditions for sparingly soluble electrolytes. Interview Problem solving.
4. Control № 1.
5. Acid-base (protolytic) equilibrium. Autoprotolysis, acidity and basicity constant, auto-protolysis constant. Calculation of pH of solutions of strong and weak acids and bases. Interview Problem solving. Analytical reactions of cations of IV-VI analytical groups according to acid-base classification.
6. Hydrolysis of salts. Constant and degree of hydrolysis. Calculation of pH values of salt solutions undergoing hydrolysis. Buffer systems (solutions). Calculation of pH of buffer solutions, buffer capacity, factors affecting the buffer capacity. The area of sufficient buffer action of the solution. Calculation of buffer capacity. Interview Problem solving. Systematic analysis of a mixture of cations of the fourth, fifth and sixth analytical groups according to the acid-base classification.
7. Control № 2.
8. Redox systems. Redox potentials. Galvanic cell. Nernst equation. Factors determining the values of electronic potentials (acidity, ionic strength, concentration of components of a redox pair). The direction of the redox reaction. The depth of the redox reaction. Calculation of equilibrium constants. Interview Problem solving. Analytical reactions of the anions of the first analytical group. Analysis of a mixture of anions of the first analytical group.

9. Equilibrium in solutions of complex compounds. The stability and non-stability constants of complex compounds (general, stepwise, concentration, true, thermodynamic). Conditional stability and instability constants of complex compounds. The effect of complexation on the solubility and deposition conditions of sparingly soluble compounds used in the analysis. Interviewing. Problem solving. Analytical reactions of anions of the second and third analytical groups. A systematic analysis of a mixture of anions of the first, second, and third groups.
10. Methods of separation and concentration of substances. Extraction. Chromatographic (non-instrumental) methods. The concept of extraction and chromatography. Chromatographic analysis methods in qualitative analysis of substances. Interview Problem solving. Detection and separation of cations by paper chromatography.
11. Control № 3.
12. Quantitative analysis. Titrimetric analysis. Basic concepts. Requirements for reac-tions in titrimetry. Reagents used in titrimetric analysis, standard substances, titrants. Typical calculations in titrimetric analysis. Methods of expressing concentrations in a titrimetric analysis (molar concentration, molar concentration of equivalent, titer, titer for the analyte (titrimetric conversion factor), correction factor). Calculation of the mass of a standard substance necessary for the preparation of titrant. Calculation of the concentration of titrant in its standardization. Calculation of the mass and mass fraction of the analyte according to the results of titration. Types (methods) of titration used in titrimetric analysis (direct, reverse, indirect). Statistical processing and presentation of the results of quantitative analysis. Methods for establishing the end point of titration (visual, instrumental). Interview Problem solving. The technique of titrimetric analysis. Statistical processing of analysis results. Aci-dimetry. The essence of the method. Application in pharmaceutical analysis. Standardization of a solution of sulfuric acid.
13. Types of acid-base titration (acidimetry, alkalimetry). The essence of the methods. The condition for the titration. Titrants. Their preparation, standardization. Establishment of titration endpoint. Application in pharmaceutical analysis. Acid-base titration curves. Calculation, construction and analysis of typical curves for cases of titration of strong acid with alkali, weak acid with alkali; strong or weak bases with strong acids. Inter-view The solution of problems. Determination of the mass of alkali in solution.
14. Indicators of acid-base titration. Requirements for indicators. Ionic, chromophore, ion-chromophore theories of acid-base titration. The pH range of the color transition indicator. Titration indicator. Classification of indicators (by the method of application, preparation, by color, by the mechanism of the process of interaction with the titrant, by composition). Choice of indicator by titration curve. Titration of polyprotic acids. Errors of acid-base titration, their calculation and elimination. Limitation of acid-base titration in the aquatic environment. Solvents used in non-aqueous titration. The completeness of acid-base reactions in non-aqueous media. Titrants of the method, their standardization. Application in pharmaceutical analysis. Co-talk. Problem solving. Alkalimetric titration of glutamic acid.
15. Control № 4.
16. Classification of methods of redox titration. Conditions for redox titration. Reaction requirements. Permanganometric titration. The essence of the method. condition for the titration. Titrant. Its preparation, standardization. Establishing the end point of the titration.

Application of permanganatometry in pharmaceutical analysis. Interview. Problem solving. Determination of the mass of iron (II) in solution.

17. Dichromatometric, · iodimetric and iodometric titration. Essence of methods. Titrants, their preparation. Determination of the end point of the titration. Application in pharmaceutical analysis. Interview. Problem solving. Determination of the mass of copper (II) in solution.
18. Redox titration indicators. Classification of indicators. Redox indicators (reversible and irreversible), indicator color change interval. Examples of redox indicators often used in analysis (diphenylamine, 1,1-phenylanthranilic acid, ferroin, etc.). Curves of redox titration: calculation, construction, analysis. The choice of indicator based on the analysis of the titration curve. Iodatometric, iodochlormetric, · bromometric and bromometric titration. Essence of methods. Titrants, their preparation. Determination of the end point of the titration. Application in pharmaceutical analysis. Interview. Problem solving. Determination of the mass fraction of ascorbic acid in the preparation.
19. Cerimetric and nitritometric titration. Essence of methods. Tit-rants, their preparation. Determination of the end point of the titration. Application in pharmaceutical analysis. Interview. Problem solving. Determination of the mass fraction of novocaine in the preparation.
20. Precipitation titration. response requirements. Titration curves, their calculation, construction, analysis. Influence of various factors on the titration jump (concentration of reagent solutions, precipitate solubility, etc.). Indicators of the method of precipitation titration: precipitation, metallochromic, adsorption. Application conditions and selection of adsorption indicators. Argentometric and thiocyanatometric titration. Titrants, their preparation, standardization. Varieties of methods of argentometry (method of Mohr, Fajans, Folgard). Essence of methods. Application in pharmaceutical analysis. Interview. Problem solving. Determination of the mass of potassium bromide in solution (Folhard method).
21. Complexim etric titration. Complexometry. Mercurymetry. Essence of methods. Indicators of complexometry (metallochromic indicators), the principle of their operation; requirements for metal-chromic indicators. Examples of metallochromic indicators (eriochrome black T, xylenol orange, etc.). Titrants of methods, their preparation, standardization. Application in pharmaceutical analysis. Interview. Problem solving. Determination of the mass of zinc in solution by comptexonometric titration.
22. Educational and research work of a student.
23. Control № 5.
24. Instrumental methods of analysis. Optical methods of analysis. Classification of optical methods. Refractometric method of analysis. Theoretical foundations of the method. Types of refractometers. The refractive index and its dependence on various factors. Analysis of single and multicomponent systems. Interview. Problem solving. Quantitative analysis of concentrated solutions by refractometry.
25. Molecular spectral analysis in the ultraviolet and visible region of the spectrum. The essence of the method. Basic laws of light absorption: Bouguer-Lambert's law, Beer's law, combined Bouguer-Lambert-Beer's law of light absorption. Optical density and light transmission, the relationship between them. Absorption coefficient (k) and extinction coefficient - molar and specific; relationship between molar extinction ratio and absorption ratio. The concept of the origin of electronic absorption spectra: features of electronic absorption spectra of organic and inorganic compounds. Photocolorimetry, photoelectrocolorimetry: their essence,

advantages and disadvantages, application. Spectrophotometry. The essence of the method, advantages and disadvantages, application. Interview. Problem solving. Photocolorimetric determination of copper (III) salt.

26. Qualitative and quantitative photometric analysis. Conditions for photometric determination (selection of photometric reaction, analytical wavelength, solution concentration and absorbing layer thickness, use of reference solution). Determination of analyte concentration: calibration curve method, one standard method, determination of concentration by molar and specific extinction coefficient, standard addition method. Determination of concentrations of several substances in their joint presence. Errors of photometric analysis, their nature, elimination. Interview. Problem solving. Spectrophotometric determination of the mass fraction of the medicinal substance.
27. Electrochemical methods of analysis. Classification of electrochemical methods of analysis. Potentiometric analysis. The principle of the method. Determination of the concentration of the analyte in direct potentiometry (calibration curve method, standard addition method). Application of direct potentiometry. Potentiometric titration. The essence of the method. Potentiometric titration curves (integral, differentiated, Gran's titration curves), application of potentiometric titration. Polarographic analysis. General concepts, the principle of the method. Polarographic curves, half-wave potential, relationship between the magnitude of the diffusion current and the concentration. Quantitative polarographic analysis, determination of the concentration of the analyte (calibration curve method, additive method, standard solution method). Amperometric titration. The essence of the method. Conditions for amperometric titration, amperometric titration curves, the concept of amperometric titration with two indicator electrodes. Determination of the mass of hydrochloric acid in solution by potentiometric titration.
28. Coulometric analysis. Method principles. Direct coulometry. Coulomb metric titration. The essence of the method. Conditions for carrying out coulometric titration. Equivalence point indication. Interviewing, problem solving.
29. Chromatographic methods of analysis. Ion exchange chromatography. The essence of the method. Ionites. ion exchange equilibrium. Methods of ion-exchange chromatography. Application of ion-exchange chromatography. Interviewing, problem solving. Determination of the mass of sodium chloride in solution by ion-exchange chromatography.
30. Gas (gas-liquid and gas-adsorption) chromatography. The essence of the method. High performance liquid chromatography. The concept of the theory of methods. Retention options. Separation parameters (degree of separation, separation factor, number of theoretical plates). Effect of temperature on separation. Methods for quantitative processing of the chromatogram (absolute calibration, internal normalization, internal standard). Interviewing, problem solving. Quantitative analysis of a medicinal substance by high performance liquid chromatography.
31. Control № 6.
32. Final control.

Text books and required supplies:

1. Kharitonov, Yu. Ya. Analytical Chemistry. Analytics 1. General Theoretical Foundations. Qualitative Analysis / ed. Grigorieva V. Yu. - Москва : ГЭОТАР-Медиа, 2021. - 608 с. -

ISBN 978-5-9704-5978-2. - Текст : электронный // ЭБС "Консультант студента": [сайт]. URL : https://www.studentlibrary.ru/book/ISBN9785970459782.html
2. Kharitonov, Yu. Ya. Analytical Chemistry. Analytics 2. Quantitative analysis. Physical-chemical (instrumental) analysis methods / Kharitonov Yu. Ya. - Москва : ГЭОТАР-Медиа, 2021. - 592 с. - ISBN 978-5-9704-5967-6. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970459676.html

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – “poor”, 70-79 – “satisfactory”, 80-89 – “good”, 90-100 – “excellent”.

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of Control No. 1.

1. The activity. Write the definition and formula (10 points).
2. Equilibrium constant. Write formula (10 points).
3. What is the solubility product? Write the formula (10 points).
4. The detection limit. Write the definition and formula (10 points).
5. When calcium oxides are detected by oxalate ions, the minimum volume of the extremely dilute solution is 0.01 ml, the detection limit is 0.04 μg. Calculate the minimum molar concentration of calcium cations (10 points).
6. Calculate the ionic strength of a 0.02 M solution of $Al_2(SO_4)_3$ (10 points).
7. Calculate the solubility of calcium fluoride in pure water and 0.01 M solution of sodium nitrate (10 points).
8. Write the reactions of potassium (K^+) cation detection (reagent, equation, analytical sign, conditions) (10 points).
9. Write the reactions of silver (Ag^+) cation detection (reagent, equation, analytical sign, conditions) (10 points).
10. Write the reactions of calcium (Ca^{2+}) cation detection (reagent, equation, analytical sign, conditions) (10 points).

Example of Control No. 2.

1. What is an acid according to the Bronsted-Lowry. Write definition and examples.(10 points)
2. The formulas of pH of strong and weak acid.(10 points)
3. The formulas of hydrolysis constant, degree of hydrolysis and pH of salt which is formed by strong acid and weak base. (10 points)
4. Buffer solution. Write definition and types of the buffer solution.(10 points)
5. 300 ml contains 0.5 g of potassium hydroxide. Calculate the pH.(10 points)
6. Calculate the pH and degree of hydrolysis of a 0.3% solution of sodium fluoride. (10 points)
7. To 15 ml of a 0.1% solution of ammonium chloride was added 10 ml of a 0.1 M solution of ammonia. Calculate the pH of the resulting solution. (10 points)
8. Write the reactions of zinc cation detection (reagent, equation, analytical sign, conditions) (10 points)
9. Write the reactions of magnesium cation detection (reagent, equation, analytical sign, conditions) (10 points)
10. Write the reactions of cooper cation detection (reagent, equation, analytical sign, conditions) (10 points)

Example of Control No. 3.

1. What is oxidation/reduction reaction. Write definition and examples (10 points)
2. Equilibrium constant for the redox-reaction. Write formula (10 points)
3. Complex compounds. Definition and examples (10 points)
4. Classification of the planar chromatography (10 points)
5. Balance redox equations using half-reaction method (10 points)
6. $KI + KMnO_4 + H_2SO_4 \rightarrow MnSO_4 + I_2 + K_2SO_4 + H_2O$
7. $Na_2C_2O_4 + KMnO_4 + H_2SO_4 \rightarrow MnSO_4 + CO_2 + Na_2SO_4 + K_2SO_4 + H_2O$

6. Calculate the potential of the hydrogen electrode in solution, 1 l of which contains 10.7 g of NH_4Cl and 0.1 mol of NH_3 (10 points)
7. Calculate the concentration of complexing agent and ligand in a 0.05 M solution of $Na[Al(OH)_4]$ (10 points)
8. Write the reactions of sulfate-ion detection (reagent, equation, analytical sign, conditions) (10 points)
9. Write the reactions of chloride-ion detection (reagent, equation, analyticalnsign, conditions) (10 points)
8. Write the reactions of nitrite-ion detection (reagent, equation, analytical sign, conditions) (10 points)

Example of Control No. 4.

9. Titrimetric analysis, titration, titrant. Write definitions (10 points).
10. Titer. Write definition and formula (10 points).
11. Methods for the preparation of titrated solutions. Preparation according to the exact weight (explain and write formulas) (10 points).
12. Direct titration. Explain and write formulas (10 points).
13. Alcalimetric titration. Preparation of the titrant solution (standardization, formulas) (10 points).
14. Acidimetry. Quantitative analysis of sodium benzoate (write the reaction equation, the indicator, the conditions of the titration, the equivalence factor of the analyte and titrant, the calculation formula for determining the mass, mass fraction, titer) (10 points).
15. Acidimetry. Quantitative analysis of hexamethylenetetramine (direct titration) (write the reaction equation, the indicator, the conditions of the titration, the equivalence factor of the analyte and titrant, the calculation formula for determining the mass, mass fraction, titer) (10 points).
16. Alcalimetry. Quantitative analysis of salicylic acid (write the reaction equation, the indicator, the conditions of the titration, the equivalence factor of the analyte and titrant, the calculation formula for determining the mass, mass fraction, titer) (10 points).
17. Alcalimetry. Quantitative analysis of menthol (indirect titration) (write the reaction equation, the indicator, the conditions of the titration, the equivalence factor of the analyte and titrant, the calculation formula for determining the mass, mass fraction, titer) (10 points).
18. Find the mass of HMTA, if 19.50 ml of 0.1 n. hydrochloric acid solution (K = 1,0150) was spent on the titration (M (HMTA)=140.186 g/mol) (10 points).

Example of Control No. 5.

1. Iodimetric titration. Preparation of the titrant solution (10 points).
2. Iodchlormetric titration. Preparation of the titrant solution (10 points).
3. Argentometric titration. Preparation of the titrant solution (10 points).
4. Iodatometric titration. Quantitative analysis of ascorbic acid (write the reaction equation, the indicator, the conditions of the titration, the equivalence factor of the analyte and titrant, the calculation formula for determining the mass, mass fraction, titer) (10 points).

5. Bromometric titration. Quantitative analysis of salicylic acid (write the reaction equation, the indicator, the conditions of the titration, the equivalence factor of the analyte and titrant, the calculation formula for determining the mass, mass fraction, titer) (10 points).
6. Nitritometric titration. Quantitative analysis of dicaine (write the reaction equation, the indicator, the conditions of the titration, the equivalence factor of the analyte and titrant, the calculation formula for determining the mass, mass fraction, titer). (10 points).
7. Complexometric titration. Quantitative analysis of Pb^{2+} salt (back titration) (write the reaction equation, the indicator, the conditions of the titration, the equivalence factor of the analyte and titrant, the calculation formula for determining the mass, mass fraction, titer) (10 points).
8. To determine the bromide ions by the Volgard method, 50 ml of potassium bromide solution was prepared. 20 ml of a standard solution of silver nitrate with a concentration of 0.05 M (K = 1.0200) was added to 15 ml of this solution. An excess of silver nitrate was titrated with 4.5 ml of a standard solution of ammonium thiocyanate with a concentration of 0.05 M (K = 1.0000). Calculate the mass of potassium bromide in the test solution (10 points).
9. 22.5 ml of potassium permanganate solution were spent for the titration of 20 ml of standard solution of sodium oxalate with equivalent molar concentration to 0.025 N. Calculate the molar equivalent concentration of potassium permanganate (10 points)
10. Find the weight of potassium bromate for preparation a 100 ml solution with a molar equivalent concentration to 0.1 N (10 points).

Example of Control No. 6.

MCQ on the portal – 60 points.

1. Refractometry (write definition). Refractive index (definition, formula) (10 points).
2. The Buger-Lambert-Beer Law (10 points).
3. Classification of the electrochemical methods of analysis (10 points).
4. The sample of mint oil was chromatographed. The chromatogram has the following peaks: 1st (not identified) with an area of 113 mm^2, 2nd (not identified) - 225 mm^2, 3rd (menton) - 246 mm^2, 4th (menthyl acetate) - 384 mm^2, 5th (menthol) - 1130 mm^2. Calculate the free menthol content of the sample (10 points).

Example of examination task

1. Basic principles of the theory of electrolyte solutions used in analytical chemistry. Classification of electrolytes.
2. Iodometry. Preparation of titrant solution (calculation formulas, reaction equation, indicator).
3. Nitritometry. Quantitative determination of streptocide (reaction, calculation of mass, mass fraction (%), titer).
4. Molecular spectral analysis in the UV and visible region of the spectrum. Bouguer-Lambert-Beer law.
5. Reactions for the potassium cation (K^+) determination.
6. Reactions for the nitrite-ion (NO_2^-) determination.
7. Calculate the active concentration of sodium ions in a solution containing 0.015 M sodium nitrate, 0.01 M nitric acid and 0.01 M acetic acid.

8. 10 ml of 0.1 M ammonia solution were added to 15 ml of 0.1% ammonium chloride solution. Calculate the pH of the resulting solution.
9. Calculate the equilibrium constant of the reaction:
10. $H_2O_2 + 2I^- + 2H^+ \rightarrow I_2 + 2H_2O$
11. 21.16 ml of 0.1 N. sodium hydroxide solution (K = 1.010) were consumed for the titration of 0.2615 g of benzoic acid (M = 122.12). Calculate the content (%) of benzoic acid.

Each answer is scored 10 points

HISTOLOGY, EMBRYOLOGY, AND CYTOLOGY

Teachers: PhD Boychuk N.V., PhD Izmailov A.A., PhD Vodunon N.R., PhD Archipova S.S., Garifulin R.R., Vavilov D.N.
Building, Department, classroom # Universitetskaya str, 13, Histology, Cytology, and Embryology Department, 306, 307, 308, 319

Contact details:
Telephone number: 2927654 (Prof. Islamov R.R.)
E-mail address: rustem.islamov@gmail.com
Office and working hours: 304 (9-17)

Total hours — 72:
Lectures 10 hours
Laboratory classes 30 hours
Independent work 32 hours

Course description
Lectures contain basic theoretic material of main discipline topics. It is usually held for the course of students at the same time. Additionally, lectures are provided on the Distance course on KSMU Education portal.
The laboratory classes involve studying of the structure of tissues, systems and organs using images derived from a microscope and histological slides. For laboratory classes student will be provided with a collection of glass slides of specimens prepared by a variety of routine and special histologic methods. Also virtual slide specimens studying in the lab classes are represented on KSMU Educational portal in a Distance course “Histology, Embryology, and Cytology”.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=1927)

Discipline aims and objectives
The aim of mastering the discipline

The aim of mastering of histology, embryology, and cytology is to provide with an understanding of the development, structure, biochemistry, chemistry and function of cells, tissues and organs.

Discipline objectives

- To develop or sharpen the important skills of observation, description and interpretation of data, which in this course primarily involves microscopic images
- To provide students with a solid understanding of the structure and function of normal cells, tissues and organs in which subsequent courses may build
- To correlate the structural organization and functional capabilities of cells, tissues and organs, utilizing information derived from current techniques (scanning electron microscopy, immunocytochemistry, etc)
- To assist the students in the development of approaches to morphologic analysis and identification which is directed toward growth in independent self-education

Skills

- Skill in using the microscope
- Be able to identify the cells and structures of all tissues and organs using light microscope
- Be able to make sketches of histological structures seen under the microscope
- Be able to make notes on your observations in order to develop ability and confidence in observing, describing and interpreting microscopic images

Lectures and laboratory classes assignment

The discipline consists of a series of lectures and a number of associated laboratory classes in terms 2nd and 3rd with general exam in the end of 3rd term. The course is divided into 4 modules. Each module consists of number of lectures and lab classes. Each module ends with a quiz.

For each module topic student must:

1) review the learning objectives
2) listen to the lecture in class and read corresponding lecture notes at the Distance course
3) complete lab class tasks
4) study corresponding texts in recommended textbooks
4) complete the online test at the Distance course
5) take the scheduled auditory or online module examinations (quizzes).

Attendance of lectures and laboratory classes is obligatory.

Lecture curriculum

1. Histological elements. Cell: plasmolemma and nucleus. Introduction to the subject. Research Methods. Cell. Plasmolemma: structure and functions. Nucleus structure. DNA, concept of a gene. Chromatin and chromosome. Types and functions of RNA
2. Organelles, cytoskeleton, cell cycle. Cytoplasm. Organelles. Elements of cytoskeleton, their structure and functions. Cellular inclusions. Cell cycle and its regulation
3. Embryonic period and beginning of organogenesis. Basic concepts of development. Fertilization, cleavage and gastrulation. Neurulation. Germ layers and derivatives. Organogenesis. Body shaping

4. Epithelial tissue. The concept of tissue. Intercellular interactions in histogenesis. Intercellular junctions. General characteristics of epithelium. Functional and structural classification. Basement membrane
5. Connective tissue. Structural organization of extracellular matrix. Cell types. Connective tissues proper and tissues with special properties
6. Skeletal tissue. Cartilage tissue: cells and cartilage matrix. Regeneration. Hormonal regulation. Bone tissue: cells and bone matrix. Bone reorganization. Hormonal regulation. Chondrogenesis and osteogenesis. Fracture healing
7. Blood and hemopoiesis. Blood functions. Morpho-functional and quantitative characteristics of blood cells. Bone marrow. Embryonic and postnatal hemopoiesis. Hemopoietic growth factors. Hemopoietic stem cell nishes
8. Muscle tissues. Morphological and functional characteristics of skeletal, cardiac, smooth muscle tissues. Molecular basis of contraction. Regeneration of muscle tissues
9. Neural tissue. Neuron. Neuroglia: macro- and microglia. Ependymal glia. Schwann cells. Myelin. Structure and regeneration of peripheral nerve. Nerve endings
10. Nervous system and sensory organs. Neurons in cerebral and cerebellar cortex. Retina: retinal neurons and their connections; characteristics of photoreceptor cells. Spiral organ: structure and functioning of hair cells. Molecular mechanisms of taste perception
11. Cardiovascular system. Vascular wall cell types. Endothelium: morphological and functional characteristics. Angiogenesis and vasculogenesis. Smooth myocytes: contractile and secretory phenotypes, humoral regulation of activity. Pericytes of the microvasculature. Types of cardiomyocytes; atriopeptin and its effects.
12. Endocrine system. The concept of hormone and interactions with target cell. Hypothalamic-hypophiseal system. Trophic hormones. Hormones of the brachiogenic group of glands. Steroidogenesis and hormones of the adrenal glands, gonads
13. Immune system. The concept of antigen and antibody. Immunocompetent and antigen-presenting cells. The main histocompatibility complex. The interaction of cells in humoral and cellular immune response. T-lymphocytes development
14. General scheme of digestive tract organization. Enteric nervous system. Enteroendocrine cells. Glands of the digestive system. Immune defense
15. Gastrointestinal tract: a comparative description of mucous membrane structure of different departments. Epithelial cell types
16. Respiratory system. Olfactory epithelium. Cellular composition of the airways epithelium. Organization of the respiratory portion and air-blood barrier. Surfactant
17. Urinary system. Structural and functional organization of nephron. Renal corpuscle and filtration barrier. Reabsorption. Peritubular capillary network. Renin-angiotensin-aldosterone system. Collecting ducts and urinary tract
18. Female reproductive system and fetal membranes. Determination of sex and development of gonads. Ovarian-menstrual cycle. Development, structure and functioning of mammary gland. Development of placenta

Laboratory class curriculum

1. Histological elements. Cell: plasmolemma and nucleus. Histological technique. Histological elements. Cell. Cell shape. Cytoskeleton. Organelles. Inclusions

2. Organelles, cytoskeleton, cell cycle. Plasmalemma. Endocytosis and exocytosis. Microvilli, stereocilia, kinocilia, cilia. Cell cycle. Cell death
3. Basic concepts of embryology. Gametes. Fertilization. Sperm cell. Oocyte. The mechanism of fertilization. Zygote, cleavage, morula, blastocyst
4. Embryonic period and the beginning of organogenesis. Primitive streak. Gastrulation: early gastrula, late gastrula (neurula). Somitogenesis. Derivatives of ecto-, meso-, endoderm
5. Module 1 Quiz
6. Epithelial tissue. Simple and stratified epithelia. Types of stratified epithelium. Classification of exocrine glands. Types of secretion
7. Connective tissues. General characteristics of connective tissue proper. Loose and dense connective tissue. Connective tissue with special properties
8. Bone and cartilage. Hyaline, elastic, fibrous cartilages. Organization of lamellar bone tissue. Blood supply. Intramembranous and endochondral osteogenesis
9. Blood. Morphological, functional, and quantitative characteristics of blood cells
10. Hemopoiesis. Blood cell development: embryonic and postnatal. Growth factors. Bone marrow
11. Muscle tissues. Skeletal muscle fiber as a symplast. Cardiac muscle tissue as functional syncytium. Sarcomere and its proteins. Smooth muscle cells and tissue
12. Neural tissue. Structure of neuron. Morphological classification of neurons. Neurons of central nervous system and ganglia. Glial cells
13. Nerve tissue of peripheral nervous system. Peripheral nerve: connective tissue sheaths, myelinated and nonmyelinated nerve fibers. Motor and sensory nerve endings
14. Module 2 Quiz
15. Central nervous system. The structure of spinal cord, cerebral and cerebellar cortex
16. Special sense organs. The structure of eyeball layers. The structure of cochlea and spiral organ of Corti. Macula and cristae. Taste bud
17. Skin and its appendages. The structure of epidermis and dermis. Morphology of sebaceous and sweat glands. The structure of hair and hair follicle
18. Cardiovascular system. Layers of blood vessel wall. Arteries and veins. Microcirculatory bed. Heart wall structure
19. Endocrine system-1. Pituitary gland and hypothalamo-hypophyseal system. Thyroid and parathyroid glands
20. Endocrine system-2. Adrenal glands: structure and hormones. Pancreatic islets. Corpus luteum of ovary
21. The immune system. Structural and functional characteristics of thymus, spleen, lymph nodes. Cells of the immune system
22. Module 3 Quiz
23. Digestive system-1. Morphological organization of digestive tube wall. Layers of tunica mucosa. Organs of the oral cavity (lip, tongue, palate, tooth)
24. Digestive system-2. Functional morphology of esophagus and stomach (cardiac, fundic, pyloric parts)
25. Digestive system-3. Structural features of small and large intestine. Cell types in epithelium of villi and crypts

26. Digestive system-4. Lymphoid tissue: single and multiple follicles (tonsils, appendix, ileum)
27. Digestive system-5. Digestive system glands: salivary glands, liver, pancreas
28. Respiratory system. The structure of airways wall, epithelium, pulmonary acinus and alveoli wall
29. Urinary system. Structural organization of the cortex and medulla of kidney. Blood supply. Renal corpuscle and nephron tubules. Collecting ducts, ureter, urinary bladder wall structure
30. Male reproductive system. Testis structure. Spermatogenic epithelium and spermatogenesis. The structure and function of epididymis, prostate gland
31. Female reproductive system. The morphology of ovary. Follicles at different stages of development. The formation and structure of corpus luteum. The structure of oviduct, uterus
32. Fetal membranes. Structure of the mature mammary gland. Structural organization of fetal and maternal parts of placenta. Amnion. Umbilical cord
33. Module 4 Quiz
34. General test
35. Final exam

Text books and required supplies

1. Danilov, R. K. Histology, Embryology, Cytology : Textbook / R. K. Danilov, T. G. Borovaya - Москва : ГЭОТАР-Медиа, . - 480 с. - ISBN 978-5-9704-6385-7. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970463857.html (дата обращения: 15.10.2024). - Режим доступа : по подписке.
2. Histology, Embryology, Cytology. - Москва : ГЭОТАР-Медиа, 2022. - 768 с. - ISBN 978-5-9704-7055-8. - Электронная версия доступна на сайте ЭБС "Консультант студента" : [сайт]. URL: https://www.studentlibrary.ru/book/ISBN9785970470558.html (дата обращения: 15.10.2024). - Режим доступа: по подписке. - Текст: электронный
3. Зиматкин, С. М. Гистология, цитология и эмбриология. Атлас учебных препаратов = Histology, Cytology, Embryology. Atlas of practice preparations : учебное пособие / С. М. Зиматкин. - 2-е изд. , испр. - Минск : Вышэйшая школа, 2020. - 87 с. - ISBN 978-985-06-3202-9. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9789850632029.html (дата обращения: 15.10.2024). - Режим доступа : по подписке.

Evaluation and grading

Student marks will be based on results of current controls (tests, and correct schetches of histological slides) and 4 post-module controls (quizes), passing during the year course. Each quiz consists of slide test and written test (or interview, or classroom control work). Marks on these controls will contribute to final general exam mark.

Tests

Tests used for current control are evaluated in a 10-point system. The test score is set in proportion to the proportion of correct answers:

90-100% - excellent rating (9.0-10.0 points)

80-89% - "good" rating (8.0-8.9 points)
70-79% - "satisfactory" rating (7.0-7.9 points)
Less than 70% of the correct answers are “unsatisfactory” (0-6.9 points).
Tests may be applicable for post-module control and cover the content of all material passed (the module quiz test, final output test, and general exam test). In such cases, the assessment is made on a 100-point scale.

Classroom control work

Classroom control work is used as form of quiz control and is evaluated in a 100-point system.
“Excellent” (90-100 points) - the work answers the questions posed in full, the correct interpretation of the terms is given, key issues are considered. A clear and clear presentation of the material, clear and evidence-based argumentation, a built-up logic of answers. Clearly and graphically constructed graphs and charts.
“Good” (80-89 points) - the work answers the question in full, the correct interpretation of the terms is given, the key questions of the topic are partially considered. Graphs and charts correctly reflect the answer to the question. The presentation is clear. The logic is not completely built and the argument is not always conclusive.
“Satisfactory” (70-79 points) - the work answers the question posed, but not fully, the correct interpretation of not all terms is given, the key issues of the topic are partially considered, the construction of diagrams and graphs does not fully correspond to the task. The presentation is not entirely clear, the logic of the answers is confused.
“Unsatisfactory” (0-69 points) - the work does not answer the question posed, the terms are misinterpreted, the key questions of the topic are not touched, the constructed graphs and schemes do not correspond to the question posed, the presentation is unclear, the logic is confused.

Oral survey (interview)

Interview is used as form of quiz control and as exam control and is evaluated in a 100-point system.
“Excellent” (90-100 points) - student clearly sets out. He knows the answers to all the questions. Knows all the concepts. Clear and evidence-based reasoning. Built logic of answers. Correct speech. Read the required literature, competently applies.
“Good” (80-89 points) – student knows the answers to all questions. He knows all the concepts, but not everything can be said correctly. Clearly, clearly stated. Not always clear and evidence-based reasoning. Built logic of answers. Correct speech. Correctly applies the basic concepts. He read the required literature, but can not always remember, apply.
“Satisfactory” (70-79 points) - student does not know the answers to all questions. Knows not all concepts. Clearly stated. Not always clear and evidence-based reasoning. The logic of the answers is confused. Mistakes in speech. Not always correctly applies the basic concepts. Student did not fully read the basic literature.
“Unsatisfactory” (0-69 points) - student does not know the answers to all questions. Own position is not defined. The arguments are contradictory. The logic of the answers is confused. Mistakes in speech. Weak vocabulary, can not express their thoughts. Does not know the basic concepts or did not read the basic literature, or read very little.

An oral survey (interview) can be used to monitor the mastery of individual topics. In this case, student knowledge is evaluated on a 10-point system.

Skill assessment

The following types of control are used to evaluate learning outcomes in the form of skills:

- tasks for compiling a description of the microscopic image of slides;
- tasks for the identification of various histological elements using a microscope and the diagnosis of slides.

• 90-100 points - the student confidently works with a microscope and various magnifications, correctly names and describes in detail the structural elements of all slides;

• 80-89 points - the student confidently works with a microscope and various magnifications, correctly names, but finds it difficult to characterize all the structural elements of slides;

• 70-79 points - the student knows how to work with a microscope, identifies the slides, but it is difficult to describe the visible microscopic image;

• Less than 70 points - the student does not handle the microscope correctly, cannot identify and characterize the slide.

Examples of Module 1 controls

Tests

1. Correct sequence of the oocyte membranes is:

A) corona radiata — trophoblast — plasmalemma

B) plasmalemma — corona radiata — amniotic membrane

C) corona radiata — zona pellucida — plasmalemma

D) zona pellucida — corona radiata — chorionic membrane

Answer is B

Questions for control work or interview

1. Structure and function of mitochondria
2. Structure of the blastocyst
3. Structure of the epithelial basement membrane

Examples of Module 2 controls

Tests

Collagen precursors are secreted by:

A) plasma cells

B) mast cells

C) fibroblasts

D) adipose cells

Answer is C

Questions for control work or interview

1. Loose connective tissue: structure, localization, functions
2. Endochondral bone formation
3. Lymphocytes: number, life span, morphological characteristics, functions

Examples of Module 3 controls

Tests

The myelin-forming cells within the central nervous system:

A) oligodendrocytes
B) astrocytes
C) microglia
D) Schwann cells
E) ependymal cells
Answer is A
Questions for control work or interview

1. Cerebellar cortex: layers and their composition
2. Layers of retina
3. Structure of arteries

Examples of Module 4 controls
Tests
In the exocrine pancreas can be found all cell types except:
A) serous cells
B) intercalated duct cells
C) endocrine cells
D) intralobular duct cells
E) centroacinar cells
Answer is C
Questions for control work or interview

1. Structure of the stomach mucosa
2. Renal corpuscle: structure and function
3. Air-blood barrier: structure and function

PATHOLOGY

Teachers PhD Aigul Galembikova, PhD Firuza Bikinieva
Building, Department, classroom, Department of General Pathology, Tolstoy street, 6/30, 1st floor, 119, 126, 131, 132 rooms.

Contact details:
Telephone number: 8 (843)236-75-31
E-mail address: general-pathology@kazangmu.ru
Office and working hours: 633 (9-17)

Class hours:
Total hours — 216:
- Lectures 32 hours;
- Practical classes 90 hours;
- Independent work 58 hours;
- Control 36 hours

Course description:

Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.

Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.

Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.

Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University https://e.kazangmu.ru/course/view.php?id=1891

Course objectives: The purpose of mastering the discipline

Pathology belongs to propedeutical disciplines supplying a bridge between the basic sciences and the clinic. The goals of mastering the pathophysiology are to provide the basic knowledge of etiology and the mechanisms of the typical pathological processes and common types of the diseases, thus establishing the effective fundamental principles for preventive and therapeutic health care measures and practices.

Tasks of the discipline:

To form knowledge in the following field:

Demonstrate a basic understanding of the concepts and elements of disease.

Apply principles of molecular biology, anatomy, physiology, biochemistry, and histology of human body systems to the pathologic processes and most common syndromes and diseases.

Demonstrate an understanding of the fundamental principles of mechanisms of diseases, the diagnosis of diseases, and the treatment of diseases.

Discuss common laboratory and diagnostic tests.

Understand the pharmacological pathogenesis-based treatment strategies of diseases and pathologic conditions.

Course topics:

Calendar plan of lectures

1. General concepts of pathophysiology
2. Inflammation 1
3. Inflammation 2
4. Allergy
5. Immunodeficiency 1
6. Immunodeficiency 2
7. Mechanisms of tumorigenesis
8. Disorders of haemostasis
9. Atherosclerosis. Coronary artery disease
10. Arterial hypertension
11. Obstructive lung diseases
12. Restrictive lung diseases
13. Pathophysiology of Acid-peptic disease

14. Pathophysiology of Pancreatitis
15. Acute and chronic Hepatitis
16. Acute and chronic renal failure

Calendar plan of workshops and practical classes

1. Cell injury and death
2. General mechanisms of hypoxia
3. Acid-base disorders
4. Water and electrolyte disorders.
5. Module 1
6. Acute Inflammation
7. Chronic inflammation
8. Pathophysiology of Fever
9. Pathophysiology of Allergy
10. Module 2
11. Immunodeficiencies
12. Pathophysiology of Tumors
13. Pathophysiology of Tumors 2
14. Module 3
15. Red blood cell disorders
16. White blood cell disorders
17. Module 4
18. Conduction disorders
19. Dysrhythmias
20. Heart failure
21. Module 5
22. Lung volumes, capacities, and the spirogram
23. Ventilation to perfusion mismatch
24. Module 6
25. Pathophysiology of Jaundice
26. Overview of liver diseases. Liver Function tests
27. Glomerular filtration rate(GFR)
28. Glomerulonephritis and nephrotic syndrome
29. Module 7
30. Reworks

Text books and required supplies:

1. General pathophysiology. Selected themes. Общая патофизиология. Избранные темы: методическое пособие для студентов / ГБОУ ВПО «Казан. гос. мед. ун-т» Министерства здравоохранения, каф. патофизиологии; [составители Л.Д.Зубаирова, С.В.Бойчук].– Казань: КГМУ, 2012. –98 с.
2. Pathophysiology of organs and systems. Selected themes. Патофизиология органов и систем. Избранные темы: методическое пособие для студентов / ГБОУ ВПО «Казан. гос мед ун-т» Министерства здравоохранения, каф. патофизиологии; [составители Л.Д.Зубаирова, С.В.Бойчук].– Казань: КГМУ, 2011. – 101 с.

3. Tests on pathophysiology/ Тесты по патофизиологии: методическое пособие для студентов / ГБОУ ВПО «Казан. гос. мед. ун-т» Министерства здравоохранения, каф. патофизиологии; [составители Л.Д.Зубаирова, С.В.Бойчук].– Казань: КГМУ, 2012. – 72 с.
4. *Kumar V., Abbas A. K., Aster J. C. Robbins and Cotran Pathologic Basis of Disease: 10th ed. – Amsterdam: Elsevier, 2020. – 932 p.*
5. Pathology. The official journal of the Royal College of Pathologists of Australasia (RCPA) https://www.sciencedirect.com/journal/pathology

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test works assessment, reports or other).

Routine performance assessment (homework, oral answer during classes, etc.) is carried out using 10-point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test. Grading: 0–69 – "noncredit", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance (10%), module and test results (50%), final exam results (40%).

Classroom rules:

- Be respectful
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Using phone is allowed only during brakes

Example of module No. 1 on the section of General concepts of pathophysiology,
Cell injury and death, Hypoxia, Acid-base and Water electrolyte disorders

1. What is etiology?
2. What does Pathophysiology deal with?
3. Which hormones are increased in stress?

4. Central to the endocrine component of the neuroendocrine response to stress is…
5. The net result of lipid peroxidation is…
6. Which enzymes are activated with the increased intracellular calcium level?
7. The major lipid-soluble antioxidant present in all cellular membranes is...
8 Apoptotic cell death is characterized by…
9. Immediate adaptive changes seen in hypoxia are…
10. Blood centralization reaction is characterized by…
11 Determine the type of hypoxia if: $PaO_2\rightarrow$, $SaO_2\rightarrow$, $CaO_2\downarrow$?
12. Metabolic alkalosis is a...
13. In what circumstances an overproduction of ketoacids occurs?
14. Respiratory acidosis develops as a result of…
15. Manifestations of metabolic acidosis include...
16. Plasma pH above 7.45, plasma $HCO3^-$ above 25 mmol/L and base excess above 3 mmol/L are characteristics of…
17. The physiologic mechanisms that contribute to edema formation include factors that…
18. The rate at which the kidney excretes or conserves sodium is dependant of…
19. Aldosterone acts at the level of the cortical collecting tubules of the kidneys for…
20. An increase in arterial resistance or decrease in venous resistance is supposed to…

Example of module No. 2 on the section of Inflammation, Fever, Allergy
What are antipyretics also known as?
How does sodium cromoglycate work in the treatment of allergic conditions?
What is the mechanism underlying specific desensitization used in the therapy of atopic diseases?
How do the tissue architecture and cellular composition change in chronic inflammation compared to acute inflammation?
Which blood type is characterized by absence of serum Abs (haemolysins) to the antigens A and B?

Example of module No. 3 on the section of <u>Immunodeficiency and Tumors Immunodeficiency</u>
1. Adaptive immune response exhibits:
a. specific recognition of the microbe
b. Immunological "memory"
c. generation of Ag-specific T- and B-cellsd.
d. all are correct

2. Absolute lymphopenia can be a signature of:
a. Wiskott-Aldrich syndrome
b. hereditary angioneurotic edema
c. Ataxia-Telangiectasia
d. Chediak-Higashi syndrome

3. T-cell receptor (TCR) recognizes a processed antigen peptide…

a. in association with a self-recognition protein, called a major histocompatibility complex (MHC) molecule
b. by membrane-bound immunoglobulin molecules that can bind a specific epitope
c. both mechanisms indicated above
d. none of indicated mechanisms

4.Secretory immunoglobulin found in saliva, tears, colostrums and bronchial, gastrointestinal, prostatic and vaginal secre-tions and consid-ered a primary defense against local infections in mucosal tissues is
a.Ig E, b.Ig G, c.Ig A, d.Ig D
X-linked hyper IgM syndrome is classified as
a. secondary cellular immunodeficiency disorder
b. primary cellular immunodeficiency disorder
c. secondary humoral immunodeficiency disorder
d. primary humoral immunodeficiency disorder

Tumors
1. Hayflick1.'s limit characterizes:
a. the limited number of contacts between cells
b. the unlimited abilities of cancer cells to proliferate
c. activation of the cellular check-points in response to DNA damage
d. cell abilities to the limited number of mitosis

2. Epstein-Barr virus mignt be the etiological factor of the following malignancies, except:
a. nasopharyngeal carcinoma
b. squamous cell carcinoma of the cervix
c. Burkitt's lymphoma

3. p53 is known as a:
a. proto-oncogene and decreased activity of this gene decreases the risk of cancer
b. onco-supressor gene and its decreased activity decreases risk of cancer
c. onco-supressor gene and its decreased activity increases risk of cancer
d. proto-oncogene and increased activity of this gene increases the risk of cancer

4. Tamoxifen is commonly used for therapy of:
a.all types of breast cancers shown here
b.ER-positive breast cancer
c.chronic myeloid leukemia (CML)
d.HER2-positive breast cancer
e.triple-negative breast cancer

5. The molecular mechanism of action of aromatase inhibitors is due to:
a. inhibition of the microtubules polymerization resulting to the mitotic spindle disassembly and cellular arrest in metaphase
b. the induction of DNA cross-links or strand-breaks in tumor cells

c. blockage of the extra-adrenal synthesis of estrogen
d. prevention of the microtubule disassembly into tubulin monomers and cell cycle arrest in anaphase

Example of module No. 4 on the section of Pathophysiology of blood
By assessing the indicators of "red blood cells", determine if there is anemia and then determine its affiliation with post hemorrhagic, "deficient", hemolytic or aplastic anemia. Explain your answer. (Cases 1 and 2)
Determine affiliation of the following hemograms with diseases. Explain your answer. Cases (3 and 4)
1. RBC 3,5 x 10^{12}/l, Hb 82 g/l
Rt 1%, MCV ↓
SI ↓ TIBC↑ Fer ↓
Pt 190 x 10^9/l
WBC 8 x 10^9/l
Neutrophil
band 4%
segmented 60%
Lymphocyte 22%
Monocyte 9%
Eosinophil 4%
Basophil. 1%

2. RBC 3,4 x 10^{12}/l, Hb 80 g/l
Rt 5%, MCV→
Pt 310 x 10^9/л
WBC 13 x 10^9/l
Neutrophil
metamyelocytes 1%
band 10%
segmented 59%
Lymphocyte 21%
Monocyte 5%
Eosinophil 3%
Basophil. 1%

3. RBC 2,05 x 10^{12}/l, Hb 64 g/l
Rt 0.3%, MCV→
Pt 100 x 10^9/l
WBC 8 x 10^9/l
Neutrophil
band 1%
segmented 38%
Lymphocyte 22%
Monocyte 4%

Eosinophil 0
Basophil. 0
Blasts 33%

4. RBC 3,7 x 10^{12}/l, Hb 122 g/l
Rt 0.8%, MCV→
Pt 200 x 10^{9}/l
WBC 3 x 10^{9}/l
Neutrophil
band 20%
segmented 22%
Lymphocyte 50%
Monocyte 7%
Eosinophil 1%
Basophil. 0

Example of module No. 5 on the section of Pathophysiology of Cardiovascular system
1. Normal sinus rhythm is defined by…
a. QRS largely regular, P must be positive in limb leads
b. P must be positive in II but negative in Avl
c. each and every QRS is preceded by a P, positive in II

2. The early lesion, or fatty streak is characterized by:
a. macrophages and vascular smooth muscle cells full of oxidised LDL cholesterol
b. skeletal muscle cells full of oxidised LDL
c. platelets full of oxidised LDL

3. Key to the onset of acute coronary syndrome ACS is:
a. fatty steak formation
b. plaque disruption and subsequent thrombus formation
c. hypercholesterolemia

4. AV nodal conduction abnormalities can occur because of:
a. reflex activation of the vagus nerve
b. activation of sympathetic fibers
c. both correct

5. Preload is largely determined by:
a. the angiotensinogen
b. the blood pressure
c. the venous return to the heart

6. Diastolic dysfunction can be present in following cases except:
a. decreased relaxation
b. decreased elastic recoil

c. decreased stiffness of the ventricle

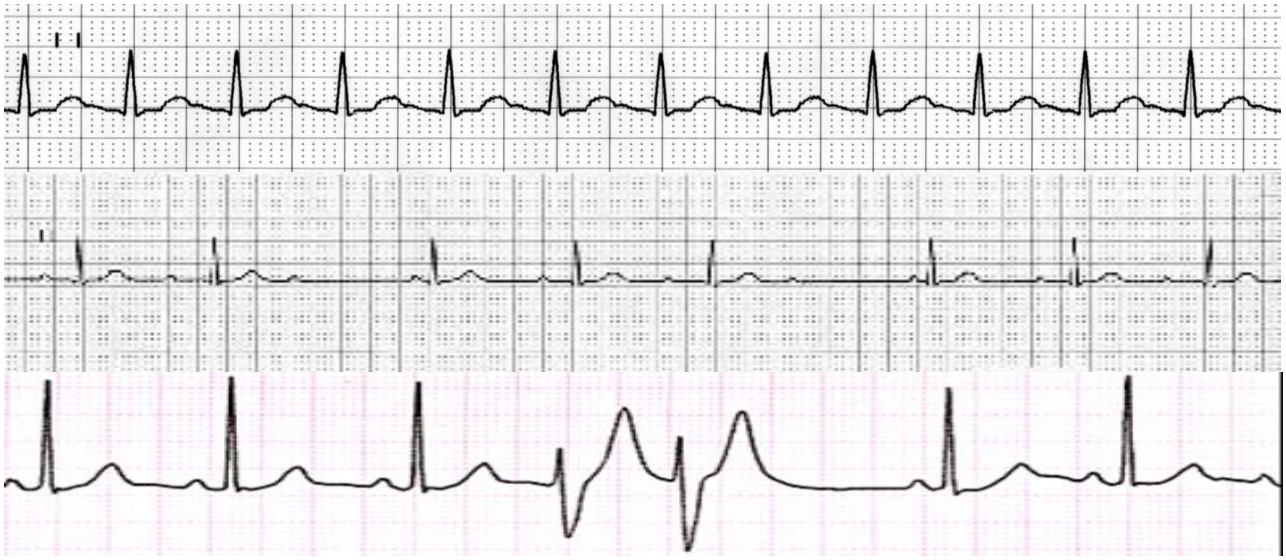
7. Symptoms of right ventricular failure include the following except:
a. accumulation of fluid in the lung venous circulation
b. generalized edema (anasarca)
c. ascites

8. Adrenal disease can cause hypertension by:
a. increased production of cortisol
b. increased production of thrombin
c. increased production of erythropoietin

9. The primary mechanism of the shock due to the blood loss is:
a. cardiac dysfunction
b. volume loss
c. volume maldistribution

10. The primary mechanism of the anaphylactic shock is
a.cardiac dysfunction
b.volume loss
c.volume maldistribution

11. Name the type of Dysrhythmia in the following strips.



Example of module No. 6 on the section of Pathophysiology of Respiratory system

1. The areas that do not participate in gas exchange in the normal lung are referred to:
a. anatomic dead space
b. alveolar dead space
c. both
d. all are wrong

2. Inspiratory reserve volume (IRV) is defined as:
a. the amount of air that can be forcibly inspired at the end of normal inspiration
b. the amount of air that can be forcibly expired at the end of normal expiration
c. the total amount of gas that can be exhaled following a maximal inhalation
d. the amount of gas remaining in the lungs at the end of a maximal exhalation

e. the amount of gas inhaled and exhaled with each resting breath.

3. The macrophage-derived factor that is involved in the injury of lung parenchyma injury (for example, in emphysema) is the following:

a. serotonine

b. histamine

c. metalloprotease type 12

d. elastase

4. The decrease of the V/Q ratio represents the pathologic processes referred to:

a. all are wrong

b. alveolar dead space

c. both cases inducated above

d. shunt

5. FEV1 is disproportionately reduced as compared to the FVC, resulting in a low FEV1/FVC ratio, in:

a. obstructive lung diseases

b. restrictive lung diseases

c. both are correct

6. Factor involved in cardiogenic pulmonary edema pathogenesis is:

a. in-creased pulmonary venous pressure (causing in-creased capillary hydrostatic pressure)

b. loss of integrity of the alveolar epithelium and vascular endothelium

c. increased alveolar surface tension (thereby lowering interstitial hydrostatic pressure)

d. decreased capillary colloid osmotic pressure

7. Technetium 99 is used for:

a. perfusion scan procedure

b. spirometry test

c. all are wrong

d. diffusion lung capacity measure

8. The presence of the transudate in the lungs is typical for:

a. cardiogenic pulmonary edema

b. both types of pulmonary edemas indicated above

c. all are wrong

d. non-cardiogenic pulmonary edema

9. Index Tiffno is typically increased in:

a. bronchial asthma

b. emphysema

c. pulmonary embolism

d. chronic bronchitis

e. interstitial pulmonary fibrosis

10. The accumulation of eosinophils in bronchial airways is responsible for the following, except:

a. non-specific hyperactivity of airways

b. inability to tolerate well the exercises

c. specific hyperactivity of airways

d. reduced lung compliance

Example of module No. 7 on the section of Pathophysiology of Liver and Kidneys

1. Hepatitis A virus is spread by:
a. the fecal-oral route b. the intimate contacts c. the infected blood

2. What factors are important in pathogenesis of the extrahepatic manifestations of acute viral hepatitis?
a. immunologic b.humoral c. neurologic

3. Coagulopathy in which the prothrombin time can be corrected by vitamin K injections but not by oral vitamin K suggests:
a. loss of clearance of activated clotting factors
b. cholestatic disease
c. decreased coagulation factor synthesis

4. In patients with severe liver disease, infections can rapidly decompensate into sepsis due to:
a. decreased clearance of bacteria by liver endothelial cells
b. decreased clearance of bacteria by hepatocytes
c. decreased clearance of bacteria by Kupffer cells

5. Bilirubin ↑, ALT normal; reticulocytes normal; prothrombin time↑; + parenteral vitamin K falls, urinary changes: urobilinogen absent, faecal changes: stercobilinogen absent. Laboratory findings are due to…
a. pre-hepatic jaundice b. hepatic jaundice c. post-hepatic jaundice

6. According to the vascular theory of ARF pathogenesis…
a. occlusion of the tubular lumen increases intratubular pressure sufficiently to decrease net filtration pressure
b. afferent arteriolar vasoconstriction and efferent arteriolar vasodilation reduces glomerular filtration
c. decreased glomerular filtration results from the afferent arteriolar vasodilation and efferent arteriolar vasoconstriction

7. Continued excessive sodium ingestion in CRF will contribute to:
a. weight gain b. hyponatremia c. hypertension

8. The net effective filtration pressure is a result of:
a. the sum of the pressure in Bowman's capsule and the plasma colloidal pressure
b. the intracapillary pressure minus the sum of the pressure in Bowman's capsule and the plasma colloidal osmotic pressure
c. the intracapillary pressure and the plasma colloidal osmotic pressure

9. Which statement is not correct?

a. the glomegular filter can be cloggede by endothelial swelling during acute inflammation which results in decreased filtration
b. the podocytes can be injured, allowing the loss of size and charge selectivity which results in decreased filtration
c. the glomegular filter can be clogged by connective tissue deposition in chronic inflammation which results in decreased filtration

10. The clinical expression of glomerular endothelium injury is known as:
a. nephrotic syndrome b. nephritic syndrome
Answer the following questions related to the case.
BP 100/60 mm Hg, HR 80 b/min, RBC $4.8x10^{12}$/l, Hb 145g/l, Leu $5.52 \cdot 10^{9}$/l
Serum: creatinine – 11.1 mg\ml, (N 12-14 mg\ml), urea – 6,8 mmol\l, (N 3-8 mmol/l), proteins – 58 g/l, (N 65-85g/l), albumins – 28g/l, (N 40-50g/l).
Diuresis: 2200 ml/day
Urine: creatinine 760 mg/ml, proteins –2.8 g/l, glucose – absent, casts – present.

11. Are there signs of azotemia?
a. yes b. no

12. Make calculation of GFR. Is it…
a. reduced b. increased c. normal

13. What is the mechanism of lowered blood pressure?
a. intravascular volume depletion b. reflex vasodilatation c. reflex vasoconstriction

14. What is the mechanism of hypoalbuminemia?
a. hemodilution b. loss of protein synthetic function of the liver c. loss of proteins with urine

15. What syndrome is the patient having?
a. Chronic renal failure b. Nephrotic syndrome c. Acute renal failure d. Nephritic syndrome

EXAMPLE OF THE FINAL EXAM

1. Definition of health by WHO
a. State of complete physical, and social well-being
b. State of complete physical, mental, and social well-being and not merely the absence of disease
c. Mental and social well-being and not merely the absence of disease

2. The example of multifactorial disease is
a. tuberculosis
b. cancer
c. AIDS

3. Dissolved oxygen molecules are registered as…
a. CaO2

b. PaO2
c. SaO2

4. The main source of free radicals is...
a. Oxygen
b. Hydrogen
c. Carbogen

5. Coagulation of blood vessels and tissue proteins occurs
a. With intense heat
b. With biologic injury
c. With lead toxicity

6. The tissue colloidal osmotic pressure…
a. pulls water out of the interstitial spaces into the capillary
b. pulls water out of the capillary into the interstitial spaces
c. pushes water out of the cell

7. Edema due to a decrease in capillary colloidal pressure
a. tends to affect tissues in dependent parts of the body
b. tends to affect the face as well as the legs and feet
c. tends to affect lungs

8. The mechanism protecting the ECF volume:
a. alterations in potassium balance
b. alterations in sodium balance
c. alterations in glucose balance

9. Metabolic alkalosis is a...
a. Decrease in HCO3- levels
b. Reduction in pH
c. Increased HCO3- levels

10. Plasma pH below 7.35 and an arterial PCO2 above 50 mm Hg refers to:
a. Metabolic acidosis
b. Respiratory acidosis
c. Respiratory alkalosis

EVALUATION OF THE MODULE ANSWER
The question card of the module 1 consists of 20 tasks. Questions are evaluated by 5 points. Total: 5 x 20 = 100 points
The question card of the module 2 consists of 5 tasks Questions are evaluated by 20 points. Total: 5 x 20 = 100 points. For example, correct answer - 10 points, correct explanation - 10 points. Total for one question: 20 points

The question card of the module 3 consists of 10 tasks. Questions are evaluated by 10 points. Total: 10 x 10 = 100 points
The question card of the module 4 consists of 4 tasks. Questions are evaluated by 25 points. Total: 4 x 25 = 100 points. For example, correct answer - 10 points, correct explanation - 15 points. Total for one question: 25 points
The question card of the module 5 consists of 10 MCQ evaluated by 7 points each and 3 ECG strips evaluated by 10 points each.
The question card of the module 6 consists of 10 tasks. Questions are evaluated by 10 points. Total: 10 x 10 = 100 points
The question card of the module 7 consists of 10 theoretical questions evaluated by 6 points each and 5 questions concerning clinical cases evaluated by 8 points each. Total: 6 x 10 = 60 points and 8x5=40.

EVALUATION OF THE FINAL EXAM ANSWER
The question card of the final exam consists of 80 questions. Grading: 0–69% – "noncredit", 70-79% – "satisfactory", 80-89% – "good", 90-100% – "excellent".

BOTANY

Teacher: Assistant of Institute of Pharmacy Julia Sprenger
Building, Department, classroom Institute of Pharmacy, 318, 209

Contact details:
Telephone number: 89534827054 (Julia Sprenger)
E-mail address: juliasprenger@yandex.ru

Total hours: 252 h
Lectures – 36 hours;
Practical classes – 105 hours;
Independent work – 75 hours;
Control – 36 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.

Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/login/index.php).

Course objectives: The purpose of mastering the discipline

The goals of mastering the botany discipline are to form in the student of an understanding of the plant organism as a component of the living system, its variability, species diversity and role in the biogeocenosis; to give future specialists the knowledge necessary for mastering a special course - pharmacognosy, as well as ideological and biological knowledge used in the study of medical and biological disciplines.

Objectives of mastering the discipline:

- acquisition of theoretical knowledge in the field of botany;
- formation of the ability to use modern technologies in the field of botany;
- acquisition of competencies necessary in the professional activity of a pharmacist;
- consolidation of theoretical knowledge in general biology.

Course topics:

3rd semester

Calendar plan of lectures

1. Anatomy of plants. Plant cell and products of its vital activity: cell wall, reserve substances, cell sap of vacuoles.
2. Plant tissues and their classification. Characteristics of formative and integumentary tissues.
3. Mechanical and conductive tissues.
4. Organs of Angiosperms. Root and its functions. Morphology of root and root systems. Anatomical structure of the root in zones of absorption and conduction of substances. Modifications of roots. Diversity of anatomical structures of the root. Use of the root as a medicinal plant raw material.
5. Stem, its functions and morphology. Anatomical structure of the stem of monocotyledonous and dicotyledonous herbaceous plants.
6. Features of stem structure of woody plants. “Stem bark” as a source of medicinal plant raw material and the diversity of its structure.
7. Leaf as an organ of photosynthesis and plant nutrition. Morphology and anatomy of the leaf. Diversity of anatomical structure of the leaf and its use as a medicinal plant raw material.
8. Concept of shoot. Main parts of the shoot. Structure of the bud and its types. Shoot branching. Modifications of shoots.
9. Morphology and anatomy of rhizomes. Use of the rhizome as a medicinal plant raw material and diversity of its structure.

Calendar plan of laboratory classes

1. Plant cell. Main organelles of plant cell: nucleus, cytoplasm, plastids, mitochondria.
2. Products of the vital activity of the cell: cell wall and reserve substances.
3. Products of the vital activity of the cell: cell sap of vacuoles and crystalline inclusions.
4. Module 1: “Plant cell”.

5. Plant tissues. Primary formative tissues.
6. Primary integumentary tissues. Excretory structures of plants.
7. Mechanical and conductive tissues. Structure and classification of vascular bundles.
8. Module 2: “Plant tissues”.
9. Vegetative organs of plants. Anatomy of stem of monocotyledonous and dicotyledonous herbaceous plants.
10. Anatomy of stem of woody plants (1, 2, 3-al, perennial).
11. Histological features of the medicinal plant raw material “bark”.
12. Anatomy of leaf.
13. Anatomy of rhizome.
14. Module 3: “Anatomy of the axial vegetative organs”.

4th semester

Calendar plan of lectures

1. Classification of Kingdom Plantae. Lower plants. Algae. Diagnostic features and significance for pharmacy.
2. Kingdom Fungi. Division Lichens. Diagnostic features and significance for pharmacy. Higher plants. Division Bryophyta.
3. Spore plants: Equisetophyta, Lycopodiophyta, Polypodiophyta.
4. Seed plants. Gymnosperms. Diagnostic features and significance for pharmacy.
5. Angiosperms – the highest stage in the evolution of the flora.
6. Phylogenetic systems of Angiosperms. Comparative characteristics of the classes of monocotyledonous and dicotyledonous plants.
7. Subclass Magnoliids and Ranunculids. Diagnostic features and families and their significance for pharmacy.
8. Subclass Dillenidae and Rosidae. Diagnostic features and families and their significance for pharmacy. Subclass Lamiids and Caryophyllidae.
9. Subclass Asterids. Class Liliopsida (monocots). Diagnostic features and families and their significance for pharmacy.

Calendar plan of laboratory classes

1. Classification of Plantae.
2. Lower plants. Algae. Diagnostic features and significance for pharmacy.
3. Kingdom Fungi. Division Lichens. Diagnostic features and significance for pharmacy.
4. Higher plants. Division Bryophyta.
5. Spore plants: Equisetophyta, Lycopodiophyta.
6. Spore plants: Polypodiophyta.
7. Module 4: “Lower and higher spore plants”.
8. Seed plants. Gymnosperms. Diagnostic features and significance for pharmacy.
9. Angiosperms – the highest stage in the evolution of the flora.
10. Phylogenetic systems of Angiosperms. Comparative characteristics of the classes of monocotyledonous and dicotyledonous plants.
11. Module 5: “Characteristics of seed plants”.
12. Subclass Magnoliids and Ranunculids. Diagnostic features and families and their significance for pharmacy.

13. Subclass Dillenidae and Rosidae. Diagnostic features and families and their significance for pharmacy.
14. Subclass Lamiids and Caryophyllidae. Diagnostic features and families and their significance for pharmacy.
15. Subclass Asterids. Class Liliopsida (monocots). Diagnostic features and families and their significance for pharmacy.
16. Module 6: “Diagnostic features of plant families”.

Text books and required supplies:

Main literature:

1. Linda R. Berg. Introductory Botany: Plants, people and the environment. Second edition. 2008. 649 pp.

Additional literature:

1. Shipunov, Alexey. Introduction to Botany. January 7, 2021 version. 192 pp.
2. Calalb Tatiana, Nistreanu Anatolie, Pharmaceutical Botany. 2017. 296 pp.
3. Ботаника [Электронный ресурс] : конспект лекций / Н. В. Степанов, И. Е. Ямских, Е. А. Иванова и др. – Красноярск : ИПК СФУ, 2009.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

To complete each laboratory work, the student has a sketchbook (workbook) for sketches and a notebook for notes. The sketchbook indicates the goals, objectives and objects of the study. When revealing each assigned task, sketches are made, under each drawing a clear and specific title. Under the title there is a legend, i.e. a decoding of the digital designations of individual parts and details of the drawing. In the drawing itself, the necessary details are indicated by an arrow and the corresponding number. All necessary notes are made correctly, accurately, using generally accepted abbreviations and terminology. The works must be individual in nature, in case of coincidence, the teacher has the right to cancel them. At the end of each considered task, appropriate conclusions are made.

The purpose of this type of assignment is to determine the level of preparation of the student to perform a laboratory study and a clear logical consolidation of the material obtained. The work is carried out throughout the laboratory lesson.

Independence in performing practical work, activity in the classroom, correctness of completing assignments, level of preparation for classes are assessed.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Midterm assessment is an exam, it consists of two stages:
1. Testing.
2. Practical skills.

The practical skills assessment stage is scheduled for the end of the semester, and testing is conducted during the session period. The results of both stages are taken into account when calculating the student's rating.

Testing exam contains 100 test tasks of the same type - choose one correct answer. Each test task is worth 1 point. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent". If the test is passed with a score below 68, the answer is considered unsatisfactory and a retake of the exam is assigned.

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during breaks
- Using phone is allowed only during breaks

Example of questions for Module №1

Non-membrane organelles include
1. Vacuole, nucleus, mitochondria
2. Lysosomes, endoplasmic reticulum, ribosomes
3. Golgi complex, mitochondria, peroxisomes
4. Ribosomes, cytoskeleton and centrosome

Formation of lysosomes of the cell occurs in
1. Golgi apparatus
2. endoplasmic reticulum

3. ribosomes
4. mitochondria

The internal semi-liquid environment of the cell is
1. Cytoskeleton
2. Cytoplasm
3. Vacuole
4. Nucleoplasm

The chlorophyll concentrated in chloroplasts
1. in matrix (stroma)
2. in outer membrane
3. in grana

Which scientist saw the cell with his microscope?
1. R. Hooke
2. M. Schleiden
3. T. Schwann
4. R. Virchow

Describe the Golgi complex
1. Participates in the packaging of substances
2. Participates in the synthesis of ATP
3. Forms the lysosomes
4. Participates in the synthesis of protein
5. Consists of cisterns and vesicles
6. Consists of a network of channels and cavities

The interior part of the leaf exchanges gases with the outside through microscopic pores is called
1. mesophyll
2. stroma
3. stomata
4. grana

How does a plant cell differ from an animal cell?
1. Has an autotrophic type of nutrition
2. Has a centrosome
3. Lacks cell wall
4. Has chloroplasts with chlorophyll
5. Has a heterotrophic type of nutrition
6. Has a vacuole with cell sap

The plasma membrane consists of molecules
1. lipids and polysaccharides
2. lipids, proteins and inclusions of carbohydrates

3. only lipids
4. only proteins

Match the structural features, functions and organelles of the cell

Structural features and functions	Organelle
Carries out energy exchange in the cell	Chloroplast / Mitochondria
The main function is the synthesis of ATP	Chloroplast / Mitochondria
Carries out the process of photosynthesis	Chloroplast / Mitochondria
The inner membrane forms folds - cristae	Chloroplast / Mitochondria
Contains the pigment chlorophyll	Chloroplast / Mitochondria

QUESTIONS TO PREPARE FOR THE BOTANY EXAM

1. Section "Plant cell"
2. Botany is the science of plants; its sections, tasks and importance for pharmacy.
3. Modern concepts of cell structure based on electron microscopy data.
4. Features of plant cell structure.
5. Cytoplasm, its functions, physicochemical properties and structure.
6. Cell nucleus, its structure, chemical composition and physical state. The role of the nucleus in cell activity.
7. Plastids, their types, structure and functions. The essence of the photosynthesis process. The role of plants for life on Earth.
8. Mitochondria, structure and functions. The essence of the respiration process and its relationship with photosynthesis.
9. Cell sap, its composition and properties. The role of vacuoles in metabolism. The use of cell sap substances for medicinal purposes.
10. Crystalline inclusions of the cell, their composition and structure. Role in the cell and use in pharmacy.
11. Excretory substances, their role in the cell, importance for pharmacy.
12. Cell membrane, its functions, formation and structure. Physical and chemical properties of the membrane.
13. Cutin, suberin, lignin. The role of these substances in the vital activity of cells. Functional features of tissues in which cells these substances are synthesized.
14. Reserve substances of the cell, their formation, shape and places of deposition in the cell and in the plant.
15. Section "Plant tissues"
16. The concept of plant tissues. Classification principles and brief characteristics of the main types of tissues.
17. Formative tissues, their functions and classification. Features of the structure of meristematic cells.
18. Primary integumentary tissues, their functions and structure.
19. Epidermis - primary integumentary tissue, its functions and structure. Diversity of structure in different plants (features of the arrangement of cells, cuticle, hairs). Types of stomatal apparatus.

20. Secondary integumentary tissue - periderm, its functions, location, origin and structure. Lenticels.
21. Secondary integumentary tissue - cortex, its functions, origin, location and structure.
22. Structure and functions of the cortex and bark in the stem of woody plants.
23. Mechanical tissues, their functions, classification and structure.
24. Basic parenchymatous tissues. Location in plant organs, functions and structural features.
25. Simple conducting tissues: vessels and sieve tubes, their functions and structure.
26. Concept of a conducting bundle; its functions and structure. Types of conducting bundles.
27. Wood and bast, their functions, formation and structure.
28. Excretory tissues. Classification, structure, location in the body.
29. Glandular hairs, glands, lactiferous glands, resin ducts, secretion receptacles (with examples from families).

Section "Vegetative organs"

1. The root, its functions. Root characteristics. Root types by origin and shape. Root metamorphoses.
2. The root, its functions and morphology (root zones). Anatomical structure of the root in the absorption zone.
3. Anatomical structure of the root of monocotyledonous and dicotyledonous plants in the conduction zone.
4. Morphology and functions of the stem. Primary structure of the stem.
5. The structure of the stem of dicotyledonous herbaceous plants: fascicular and non-fascicular types.
6. The structure of the stem of woody dicotyledonous plants (primary and secondary). Medicinal raw material "bark" ("cortex"); a plant organ that serves as its source. Anatomical structure of the "bark" (oak bark, buckthorn bark, etc.)
7. Leaf, its functions and structure (parts of the leaf). Diversity of leaf morphology (using examples of families).
8. Anatomical structure of the leaf. Diagnostic features in determining the medicinal raw material "leaves" (folia).
9. Coniferous leaf, its morphology and anatomy.
10. Plant shoot, its functions and structure. Branching and its types.
11. Shoot, its functions and structure. Shoot metamorphoses.
12. Structure, functions and types of buds in plants.
13. Rhizome morphology. Anatomical features of rhizomes of monocotyledonous plants.
14. Anatomical structure of rhizomes of dicotyledonous plants (fascicular and non-fascicular types).
15. Anatomical structure of medicinal raw materials "Rhizomes - (rhizomata)".

Section "Growth, development and reproduction of plants"

1. Vegetative reproduction of plants, its essence, distribution in nature and practical use.
2. Asexual reproduction of higher plants, its essence, place in the life cycle. Formation of spores.

3. Sexual reproduction of higher plants, its essence, place in the life cycle. Zygote is a new young organism.
4. Asexual and sexual reproduction of plants. The concept of alternation of generations. The place of meiosis in the life cycle of higher plants.
5. Gametophyte of higher plants, its place in the life cycle. The structure of the gametophyte in different plant divisions.
6. Sporophyte of higher plants, its place in the life cycle. The structure of the sporophyte of different plant divisions.
7. The concept of plant growth and development. The relationship between growth and development.
8. Plant growth and its patterns. The influence of external and internal factors on growth.
9. Plant development. Ontogenesis and phylogenesis. The main stages in plant development.

Section "Plant Taxonomy"

1. General characteristics and taxonomy of lower plant divisions.
2. Fungi: systematic position and general characteristics. Individual representatives of fungi, their importance in nature and use in pharmacy.
3. Algae. General characteristics and taxonomy. The role of algae in nature and use in pharmacy.
4. Characteristics of the divisions "Brown and Red Algae". Practical use of some representatives.
5. General characteristics of the division "Lichens. Features of nutrition, structure and body shape. The role of lichens in nature".
6. The access of plants to land and the appearance of organs of higher plants. Distinctive features of lower and higher plants.
7. Division Bryophytes. Distinctive features of the division. Taxonomy of mosses. Habitat and distribution of individual representatives in Tatarstan, their role in nature and use in practice.
8. Division Bryophytes. Life cycle of mosses on the example of Polytrichum commune.
9. Division Bryophytes. Characteristics of sphagnum mosses.
10. Division Bryophytes. Class Liverworts. Development cycle of bryophytes on the example of Marchantia.
11. Morphological features of plants of the division Equisetoides. Medicinal species and possible impurities to them.
12. Division Equisetoides. Taxonomy of the department. Habitat and distribution of individual representatives in Tatarstan, their role in nature and use in practice.
13. Division Equisetoides. The development cycle on the example of Eguisetumarvense.
14. Division Lycopodiophyta. The development cycle on the example of Lycopodiumclavatum.
15. Division Pteridophyta. The development cycle on the example of Dryopterisfilix-mas.
16. Taxonomy of the division Pteridophyta. The habitat and distribution of individual representatives in Tatarstan and their practical use (distinctive features of some species).
17. The development cycle of gymnosperms on the example of Scots pine.

18. Division Gymnosperms. The appearance of a seed is a qualitatively new stage in the evolution of higher plants.
19. Division Angiosperms. The development cycle on the example of bird cherry.
20. General characteristics of the division Angiosperms. Flower, its origin and structure.
21. Androecium of a flower. Functions and diversity of structure (on examples from families).
22. The structure of the stamen. The processes occurring in the anther. The structure of the pollen grain (male gametophyte).
23. The gynoecium of the flower. The functions and diversity of the structure.
24. The shape of the receptacle and the position of the ovary in the flower. The anatomical structure of the ovary.
25. Variations in the morphology of the flower of different systematic groups (perianth, androecium, gynoecium, receptacle, flower types).
26. Division Angiosperms. The formation and structure of the ovule. The structure of the embryo sac (female gametophyte).
27. Fertilization of angiosperms. The formation of the seed and fruit. The formation of the seed of angiosperms. The structure and types of seeds.
28. The structure of the seed of angiosperms. The importance of seeds in the life of plants.
29. Comparative characteristics of the seeds of angiosperms and gymnosperms. Evolutionary and progressive features of the seeds of angiosperms.
30. The fruit of angiosperms, its functions, structure. Classification of fruits using examples from families.
31. Fruit, its structure and functions. Peculiarities of the structure of Rosaceae fruits.
32. Inflorescences, their biological role and structure. Types of inflorescences using examples from families.
33. Paths of evolution of Angiosperms. Primitive and progressive features in the structure of a flower, their evolutionary significance.
34. Comparative characteristics of classes of Angiosperms.

Section "Fundamentals of Ecology, Botanical Geography and Geobotany"

1. Ecological factors and their influence on plants.
2. Heat as an ecological factor. The concept of a life form. Classification of life forms of plants.
3. Plants and the water factor. Xerophytes, hygrophytes and mesophytes; their anatomical features.
4. Light as an ecological factor. Light-loving, shade-loving and shade-tolerant plants.
5. Biotic factors of the environment: the influence of plants, animals and humans.
6. Flora and vegetation. The concept of a habitat. Cosmopolitan and endemic plants.
7. Floral regions of the globe and their characteristics.
8. Plant communities (phytocenoses), their features and structure.
9. Characteristics of a meadow as a plant community. Meadow medicinal plants.
10. Characteristics of a forest as a plant community. Forest medicinal plants.

Section "Overview of Angiosperm Families"

1. Subclass Magnoliidae. Phylogenetic significance of the subclass. Botanical and economic characteristics of the family Magnoliaceae.
2. Subclass Ranunculidae. Botanical and economic characteristics of the families: Papaveraceae, Ranunculaceae.
3. Subclass Hamamelididae. Botanical and economic characteristics of the family Betulaceae.
4. Subclass Caryophyllides. Botanical and economic characteristics of the families: Caryophyllales, Polygonaceae.
5. Subclass Dilleniumidae. Botanical and economic characteristics of the families: Ericaceae, Nettle, Brassicaceae.
6. Subclass Rosidae. Botanical and economic characteristics of the families: Legumes, Rosaceae, Araliaceae, Celery, Rhamnoides.
7. Subclass Asteridae. Botanical and economic characteristics of families: Boraginaceae, Scrophulariaceae, Honeysuckle, Solanaceae, Lamiaceae, Asteraceae.
8. Subclass Liliidae. Botanical and economic characteristics of families: Liliaceae, Allium, Orchidaceae, Poaceae.

EXAMPLE OF QUESTIONS FOR EXAM

A cell that possesses a nucleus and other organelles surrounded by membranes called
a. eukaryotic
b. complex
c. simple
d. prokaryotic

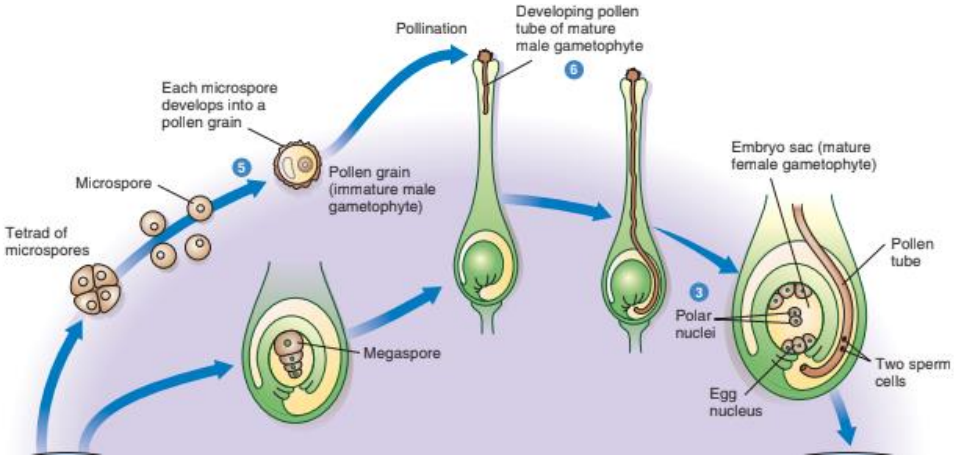
A comparatively rigid supporting wall exterior to the plasma membrane in plants, fungi, prokaryotes, and certain protists
a. plasma membrane
b. plasma surface
c. cell wall
d. cell membrane

A microscope, where the electron beam does not pass through the specimen, instead, the specimen is coated with a thin film of gold or some other metal. When the electron beam strikes various points on the surface of the specimen, secondary electrons are emitted whose intensity varies with the contour of the surface is called a
a. transmission electron microscope (TEM)
b. scanning electron microscope (SEM)
c. heavy microscope
d. light microscope

Choose the main characteristics of mushrooms
a. prokaryotes
b. Osmotrophs

c. Generally surrounded by cell wall
d. Eukaryotic
e. Most form spores as reproductive units

What generation is shown in the picture?

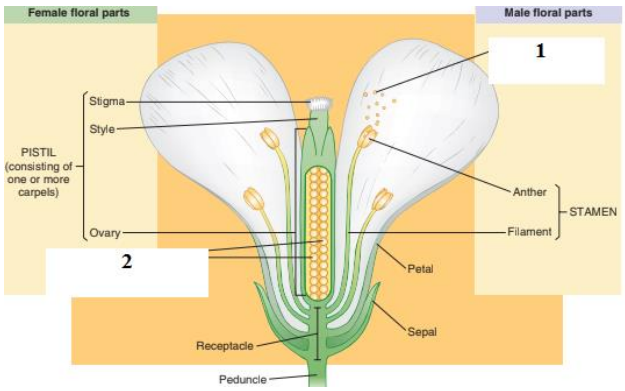


a. diploid (2n) sporophyte generation
b. haploid (2n) gametophyte generation
c. haploid (n) gametophyte generation
d. diploid (n) sporophyte generation

What is shown in the picture?

a. Rhizoids
b. Zygote
c. Sorus
d. Sporangium

What is shown in figure 1 and 2?



a. 1-Petal, 2- Ovary
b. 1-Pollen grain, 2-Ovules
c. 1-Ovules, 2 - Anther
d. 1-Stigma, 2-Ovary

What is shown in the picture?

a. prothalli
b. Frond of fern
c. fiddlehead

What representative fruit type is shown in the figure?

a. Capsule (simple fruit)
b. Follicle (simple fruit)
c. Legume (simple fruit)

What type of inflorescence does this plant have?

a. Raceme
b. Spike
c. Head
d. Umbel

Evaluation of the Exam answer
The exam test consists of 100 questions.
Each question of the exam is evaluated by 1 point.
Total: 1 x 100 = 100 points

ASSESSMENT OF THE FUNCTIONAL STATE OF THE HUMAN BODY

Teachers: PhD Telina Evelina Nicolaevna, PhD Martinov Alexandr Vladimirovich, PhD Khabibrakhmanov Aidar Nazimovich,
Building, Department, classroom # Universitetskaya, 13, Department of Normal Physiology, 310 - 315
Contact details:
Teacher - telephone number: 89600365142 (PhD Telina Evelina Nicolaevna)
E-mail address: evelinatelina@mail.ru
Lecturer - telephone number: 89600365142 (PhD Telina Evelina Nicolaevna)
E-mail address: evelinatelina@mail.ru
Office and working hours: Universitetskaya, 13, 325, 327 (9-17)

Total hours – 72 h:
Lectures: 10 h;
Practical classes: 30 h;
Independent work – 32 h;
Control – credit

Course description:

Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University https://e.kazangmu.ru/course/view.php?id=1919

Course objectives: The purpose of mastering the discipline

The goals of mastering the Assessment of the functional state of the human body discipline are formation of systematic knowledge about the vital activity of the whole organism and its individual parts and about the main ways to assess the functional state of the body; formation the skills of interpretation of basic physiological principles and basic methods of physiological functions examination, which submitted to the activities of the all organism systems.
Tasks of the discipline:
1. Research and awareness-raising activities:
- independent analytical, scientific and research work;
- participation in the solution of individual research and scientific-applied tasks for the development of new methods and technologies in the field of pharmacy
- providing advice to specialists of medical organizations, pharmaceutical organizations and the public on the use of medicines;
- formation of patients' motivation to maintain health

Course topics:
Section 1. Assessment of physical state.
Section 2. Physical examination methods: auscultation.
Section 3. The functional state of the respiratory system.
Section 4. Functional state of the heart.
Section 5. Functional state of sensory systems.
Section 6. Properties of the nervous system.
Section 7. Functional states of a person.
Section 8. Laboratory research methods.

Calendar plan of lectures
IV semester

1. Electrocardiography.
2. The functional state of the respiratory system. Spirometry.
3. General properties of sensory systems. Visual perception.
4. Auditory, gustatory and olfactory perception.
5. Pain.

Calendar plan of practical classes

IV semester

1. Assessment of physical condition and working capacity.
2. Auscultation of the heart. Heart Sounds.
3. Electrocardiography.
4. Auscultation of the lungs. Spirography. Peak fluometry.
5. Visual perception.
6. Auditory, gustatory and olfactory perception.
7. Properties of the nervous system. Brain asymmetry.
8. Pain.
9. Complete blood count, biochemical analysis of blood test. Urine analysis.
10. Control class.

Text books and required supplies:

1. Ganong's Review of Medical Physiology. 26th Edition. MC Graw Hill. 2019. 1792p. ISBN-10: 978-1-26-012241-1.
2. Hall J. Guyton and Hall Textbook of Medical Physiology. 13rd Edition. Elsevier. 2016. 1046p. ISBN 13:9781455770052.
3. W., Boulpaep E. Medical Physiology. 3rd Edition. Elsevier. 2016. 1312p. eBook ISBN: 9780323391597
4. Educational portal course: Normal Physiology for faculty of General Medicine https://e.kazangmu.ru/course/view.php?id=1919

Evaluation and grading:

Monitoring progress is carried by the end of each section (written papers/oral examination/test/ abstracts/reports or others).

Routine performance assessment (homework, practical work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral examination/situational task). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Control class is held in forms of MCQ test (one correct answer). Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

EVALUATION of knowledge, abilities and skills

- MCQ Test

Example:

1. The "P" wave on the ECG represents: a) atrial depolarization; b) atrial repolarization; c) ventricular depolarization; d) ventricular repolarization.

Evaluation criteria: The score on the test is set in proportion of correct answers: 90-100% - score "excellent" 80-89% - score "good" 70-79% - score "satisfactory" Less than 70% of correct answers – score "unsatisfactory".

- Oral examination

Example:

"Refractive abnormalities of the eye", "Phonocardiography"

Evaluation criteria: "Excellent" (90-100 points) – The student is fully proficient in the basic material, possesses additional information, is able to analyze physiological processes and mechanisms, reveal their significance and interrelation with other organs and systems. "Good" (80-89 points) – The student knows the basic material, but does not fully possess additional information. The answer contains minor errors in the logical sequences. "Satisfactory" (70-79 points) – The student partially owns the material, makes mistakes in terminology, logical sequences, physiological mechanisms, the significance of physiological processes and their relationship with other organs and systems. "Unsatisfactory" (0-69 points) – The student has scattered knowledge with significant errors in physiological processes and mechanisms, makes mistakes in terminology, cannot analyze the significance of physiological processes.

- Reports

Example:

"Comprehensive assessment of health, physical development, physique and fitness", "Theories of color perception. Color vision disorders"

Evaluation criteria: "Excellent" (90-100 points) – the report fully reveals the topic, the student tells, practically without looking at the text and answers all additional questions. "Good" (80-89

points) – the report reveals the topic, but requires additions, the student tells based on the text, but without reading it out and answers all additional questions: "Satisfactory" (70-79 points) – the report reveals the topic, but requires additions, the student cannot answer most of the additional questions, partially reads the text during the story. "Unsatisfactory" (0-69 points) – the report does not disclose the topic, the student cannot answer most of the additional questions, reads out the text.

- Case-study

Example:

1. "On the patient's ECG, the distance between adjacent “R” waves is 1.2 seconds. The QRS complex follows the “P” wave. Count the heart beat rate and make a conclusion about the pacemaker." Answer: Heart rate = 60: 1.2 = 50 beats/min. The patient has bradycardia, sinus rhythm.

Evaluation criteria: "Excellent" (90-100 points) – the correct answer is given, the essence and mechanisms of physiological processes are explained, their significance for the normal functioning of organs and systems is revealed, if necessary, an analysis of physiological constants and laboratory results is given, the student uses additional information. "Good" (80-89 points) – a short correct answer is given, the essence and mechanisms of physiological processes are explained, their significance for the normal functioning of organs and systems is revealed, if necessary, an analysis of physiological constants and laboratory results is given, the student does not use additional information. "Satisfactory" (70-79 points) – a short answer to the question is given, mistakes are made, the essence of physiological processes is not explained, an incomplete analysis of physiological constants and laboratory results is given. "Unsatisfactory" (0-69 points) – an incorrect answer is given, the problem is not solved.

HYGIENE

Teachers: Assistant Ksenia Lushanina, Assistant Nikita Chumarev.
Building, Department, classroom: ULK-2, Department of General Hygiene, 208, 210.
Contact details:
Telephone number: 89600353064 (Ass. Ksenia Lushanina)
E-mail address: kseniya.19@mail.ru
Office and working hours: 206 (09:00 – 17:00)

Class hours:
Total 72 h:
Lectures - 10 hours;
Practical classes – 30 hours;
Independent work – 32 hours.

Course description:

Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/).

Course objectives: The purpose of mastering the discipline

The goals of mastering the hygiene discipline are development of personal qualities in students, formation of general professional and professional competencies for protecting the health of citizens by ensuring the provision of high-quality dental care in accordance with established requirements and standards in the field of healthcare and medical sciences.

Tasks of the discipline:
Medical activities:
– study of the regulatory framework for the placement, arrangement, equipment, maintenance, anti-epidemic regime, preventive and anti-epidemic measures, working conditions of the personnel in medical organizations providing dental care to the population;
– introduction of modern methods of prevention, diagnosis and treatment of dental diseases;
– conducting health education work among the population, as well as using the media;
– forming motivation among the population, patients and their families aimed at a healthy lifestyle;
– teaching patients basic hygienic health measures that help prevent the occurrence of the most common diseases and improve health.

Organizational and managerial activities:
– creation of working conditions in medical organizations with a dental profile required by law, as well as favorable conditions for the population to receive medical services;
– maintenance of accounting and reporting medical documentation and submission of activity reports.
Research activities:
– analysis of scientific literature and official statistical reviews, participation in statistical analysis and public presentation of the results;
– participation in solving individual research and applied scientific problems in the field of healthcare in diagnostics, treatment, medical rehabilitation and prevention.

Course topics:

Calendar plan of lectures

1. Introduction to Hygiene as a Science. Historical Foundations and Modern Tasks of Hygiene. Scientific principles, legal and business foundations of preventive medicine.
2. Chemical composition of atmospheric air and its hygienic significance. Pollution and protection of atmospheric air as a hygienic problem.
3. Ecological and hygienic characteristics of water. The importance of the chemical composition of water in the development of dental diseases Prevention of non-infectious diseases of the dental profile.
4. Hygienic aspects of natural and geographical conditions of the environment and human health. Hygienic problems of urbanization.
5. Hygiene of nutrition. Modern theories of rational nutrition. Biological and ecological problems of nutrition.
6. Occupational hygiene of dentists and dental technicians. Occupational diseases of dentists.
7. Sources of ionizing radiation. Ionizing radiation as an environmental factor. Occupational hygiene when working with sources of ionizing radiation.
8. Hygiene and sanitary-hygienic requirements for the arrangement, organization, and operating mode of medical organizations with a dental profile.

Calendar plan of laboratory classes

1. Hygiene of the air environment. Research methods and hygienic assessment of the microclimate of residential and public buildings. Research methods and hygienic assessment of insolation, natural and artificial lighting, natural and artificial ventilation of premises for various purposes.
2. Hygiene of medical institutions. Sanitary and epidemiological requirements for organizations providing dental services to the population.
3. Occupational hygiene and health protection of workers. Industrial hazards and occupational diseases. Hygienic measures of a health-improving nature in human labor activity.
4. Hygiene of water and soil. Hygienic requirements for drinking water quality. Organization of water supply in emergency and extreme situations. Soil hygiene. The role of water and soil in the occurrence, treatment and prevention of dental diseases. Module on topics 1-4.
5. Hygienic requirements for rational nutrition. Chronometric-tabular method for calculating the body's energy expenditure. Calculating the body's needs for essential nutrients and energy. Calculating the nutritional value of rations using chemical composition tables. Nutrition standards for individual population groups.
6. Food poisoning, its investigation and prevention. Classification of food poisoning. Sources and conditions of occurrence of food poisoning. Prevention of food poisoning of various etiologies. Investigation of food poisoning and tactics of a doctor in case of suspected food poisoning.
7. Module on topics 5-6. Hygiene of children and teenagers. Methods of assessing the physical development and health of children and teenagers. Hygienic requirements for the educational process.

8. Module on topics 7. Sources of ionizing radiation in the environment and medical practice. Principles of protection when working with radioactive substances and sources of ionizing radiation.
9. Outcoming testing. Final test.

Text books and required supplies:

1. Hygiene: a textbook for dentists / edited by O. V. Mitrokhin. - Moscow: GEOTAR-Media, 2022. - 368 p. - ISBN 978-5-9704-7226-2. - Text: electronic // Electronic Library System "Student Consultant": [website]. - URL: https://www.studentlibrary.ru/book/ISBN9785970472262.html (accessed: 07/07/2023). - Access mode: by subscription.
2. Hygiene and human ecology: textbook / edited by. ed. V. M. Glinenko; E. E. Andreeva, V. A. Kataeva, N. G. Kozhevnikova, O. M. Mikailova. - 3rd ed., rev. and additional - Moscow: GEOTAR-Media, 2023. Access mode: https://www.studentlibrary.ru/book/ISBN9785970475225.html
3. General hygiene. Guide to practical classes: study guide / O. V. Mitrokhin, V. I. Arkhangelsky, N. A. Ermakova [et al.]; First Moscow State Medical University named after I. M. Sechenov, Ministry of Health of the Russian Federation (Sechenov University). - Moscow: GEOTAR-Media, 2021. - 164, [4] p.
4. Hygiene: textbook / [G. I. Rumyantsev et al.]; under the general editorship of G. I. Rumyantsev. - 2nd ed., revised and enlarged. - M.: GEOTAR-Media, 2009. - 607 p.
5. Hygiene of medical organizations providing dental care to the population: textbook. manual for dental students. fak. / Kazan. state honey. University of Healthcare of the Russian Federation Federation; [compiled by: A. V. Shulaev, A. K. Galeev, N. I. Sharafutdinov]. - Electron. text data (983 KB). - Kazan: Medicine, 2019. - 52, [1] p. : ill. - Adj.: p. 40-49. - Bibliography: p. 49-51. - ISBN 978-5-7645-0665-4
6. Requirements for insolation and artificial lighting of premises for various purposes: a teaching aid for students of the Faculty of Dentistry / L. R. Tukhvatullina, L. N. Rastaturina, A. B. Tazetdinova; Kazan State Medical University of the Ministry of Health of the Russian Federation, Department of General Hygiene. - Kazan: Kazan State Medical University, 2021. - 53 p.
7. Hygiene: a teaching aid for students of the dental faculty / Kazan State Medical University of the Ministry of Health of the Russian Federation; [compiled by A. V. Shulaev et al.]. - Electronic text data (298 KB). - Kazan: Medicine, 2019. - 55, [1] p. - ISBN 978-5-7645-0664-7

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework

the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Examples of tasks:

– test:

At low atmospheric pressure, a person develops:
1. decompression sickness;
2. mountain sickness;
3. Graves' disease;
4. Esno and Coxsackie disease;
5. hypervitaminosis D.

Select the hygienic principles of standardizing the microclimate of premises:
1. number of people, age;
2. number of heating radiators;
3. purpose of the premises (severity of work performed);
4. characteristics of visual work;
5. climatic region, season.

Name the reasons leading to food poisoning:
1. reduction in the shelf life of perishable products;
2. admission to work of patients with chronic gastritis;

3. admission to work of patients with tonsillitis;
4. violation of the canteen schedule;
5. increase in the shelf life of prepared meals.

– oral questioning:

1. The main tasks of hygiene, the history of the development of hygiene as a science.
2. The concepts of alcoholism, drug addiction, toxicomania, the main principles of their prevention.
3. Give a hygienic characteristic of the lithosphere and soil.
4. What is one of the features of water as part of the hydrosphere?
5. Name the principles of hygienic regulation of lighting in rooms.

– case tasks:

Occupational hygiene. An assessment of working conditions was carried out in a workshop of a household chemicals plant. The microclimate in the production area meets sanitary and hygienic requirements. The noise intensity at the press operators' workplaces is 105 dBA. Carbon monoxide (below MAC), ethylene oxide up to 1.5 MAC were detected in the air of the working area. Assess the working conditions and give recommendations for their improvement.

1. Determine which production factors affect the worker and what are the numerical parameters of these factors.
2. Using regulatory documents (SanPiN) and tables of other scientific and technical documentation (NTD), determine the permissible levels of exposure to production factors (MPC, MPL, etc.).
3. Compare the actual and permissible levels and determine the degree of deviation of the parameters of the production environment and work process from the current hygienic standards.

- For chemicals, biological factors and fibrogenic dust - how many times the level of the active factor exceeds the MAC; - For physical factors - the difference between the current level and the permissible (PUL).

MEDICAL BIOCHEMISTRY

Teachers: associate professor Alexey Nabatov
Building, Department, classroom Tolstogo st. 6/30; Biochemistry department: 319, 330, 331
Contact details:
Telephone number: 89872675387 (associate professor A. Nabatov)
E-mail address: rastoska@mail.ru
Office and working hours: 327 (9-17)

Total hours — 216:
- Lectures 32 hours;
- Practical classes 90 hours;
- Independent work 58 hours;
- Control 36 hours)

Course description:

Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/enrol/index.php?id=1895).

Course objectives: The purpose of mastering the discipline

The main purpose is to teach students to use in their further study of alternative disciplines and professional activity their knowledge concerning chemical composition and metabolic processes which occur in the human's body cells and tissues as the indices that allow to differ the normal patient's state and a disease ; to teach the students to realize the actual basis molecular mechanisms that determine normal physiological functions, and a number of pathological conditions in the cases of their disturbances as well.

Tasks of the discipline:

The whole Biochemical course is divided onto the theoretical and practical parts. The principal tasks of theoretical part are to get the knowledge concerning structure, physical and chemical properties, metabolism and functions of the abundant organic compounds, forming the tissues and organs of human body.

The principal task of practical classes is to teach students to use obtained theoretical biochemical knowledge in their practical work as physicians ; to make them to be acquainted with the most frequently used clinical and biochemical techniques and to make them to be able to resolve certain medical problems by means of biochemical reveal of a number of protein, carbohydrate and lipids compounds in blood and urine; to form a true notion of generally accepted biological phenomena and world-wide shared philosophy of life.

Course topics:

Calendar plan of lectures

1. Introduction to biochemistry. Proteins, their biological role. Amino acids are structural monomers of protein. Structure and classification of amino acids and proteins. Structure and levels of organization of proteins. Physico-chemical properties.
2. Variety of proteins. Globular and fibrillar proteins. Classification of proteins according to their biological functions: enzymes, receptor proteins, transport proteins, antibodies, protein hormones, contractile, structural proteins. Structure and properties of complex proteins. Myoglobin. Hemoglobin. Forms of human hemoglobins.
3. Nucleic acids Structure and functions. Matrix biosynthesis. Protein synthesis.
4. Enzymes. Structure, properties and functions.
5. Energy exchange. Biological oxidation.
6. Photosynthesis. Stages of photosynthesis. Mechanisms of light and dark stages of photosynthesis. Formation of proton potential and phosphorylation mechanism. Formation of carbohydrates from CO2 from the Kelvin cycle.

7. Chemistry and metabolism of carbohydrates. The most important carbohydrates of human and animal tissues. Their biological role. Digestion and absorption of carbohydrates. Breakdown and synthesis of glycogen in the liver.
8. Aerobic breakdown of glucose. Specific transformations of glucose to pyruvate. Substrate phosphorylation. Oxidative decarboxylation of pyruvic acid: structure of the pyruvate dehydrogenase complex (enzymes and coenzymes). Anaerobic glycolysis. Lactic acid fermentation. Glycogenolysis. Alcoholic fermentation.
9. Krebs cycle: sequence of reactions and characteristics of enzymes. Substrate phosphorylation reaction in the citric acid cycle, high-energy compounds. Energy and plastic functions of the Krebs cycle. Regulation of the activity of the pyruvate dehydrogenase complex and the citric acid cycle. Pentose phosphate pathway for glucose conversion. Formation of NADPH and pentoses.
10. Biosynthesis of glucose. Cori cycle. Regulation of carbohydrate metabolism.
11. Chemistry and lipid metabolism. The most important lipids of human tissues. Digestion and absorption of lipids. Pathways for the conversion of reserve and structural lipids.
12. Metabolism of fatty acids. Activation and transport of fatty acids into mitochondria. The role of carnitine. b-oxidation of saturated and unsaturated fatty acids with an even number of carbon atoms. Prostaglandins. Phospholipids. Metabolism of polyunsaturated fatty acids. Formation of eicosanoids, their biological role. Synthesis and breakdown of triacylglycerols and glycerophospholipids: sequence of reactions. Differences in TAG synthesis in the liver and adipose tissue. Interconversion of glycerophospholipids. Fatty degeneration of the liver. Lipotropic factors.
13. Biosynthesis of cholesterol. Conversions of cholesterol in the body and ways of its elimination. Classification of blood lipoproteins. Atherosclerosis. Transport lipoproteins: structure, formation, functions. Apoproteins. The role of lipoprotein lipase and lecithin cholesterol acyltransferase (LCAT). Metabolism of plasma lipoproteins. Atherosclerosis. Atherogenic coefficient. Hormonal regulation of lipolysis and lipogenesis. Xanthomas.
14. Metabolic blocks (Niemann-Pick and Gaucher diseases).
15. Metabolism of proteins and amino acids. Digestion and absorption of proteins. Common pathways of amino acid metabolism. Ammonia neutralization. Urea synthesis in the liver.
16. Basic properties of blood protein fractions. Blood coagulation system. Internal and external coagulation pathways. The role of Vitamin K in blood clotting. Basic mechanisms of fibrinolysis. Basic blood anticoagulants. Hemophilia. Heme biosynthesis and its regulation. Heme breakdown. Neutralization of bilirubin. "Direct" and "indirect" bilirubin. Bilirubin metabolism disorder. Jaundice: hemolytic, obstructive, hepatocellular. Jaundice of newborns.
17. Biochemistry of the liver. Detoxification functions of the liver. Intracellular metabolism of foreign drugs. Regulation of metabolism.

Calendar plan of laboratory classes

1. Features of working in a biochemical laboratory. Safety precautions. Introduction to biochemistry. Qualitative reactions to specific groups of proteins and amino acids.
2. Physico-chemical properties of proteins. Factors of protein stability in solution. Denaturation of proteins.

3. Isolation and purification of proteins. Molecular weight of proteins. Separation of albumins from globulins in blood serum.
4. The discovery of the components of complex proteins–chromoproteins, nucleoproteins, phosphoproteins. Complex proteins are glycoproteins. The discovery of the constituents of saliva mucin.
5. Module: "Structure and functions of proteins and nucleic acids".
6. General properties of enzymes. Hydrolysis of starch by saliva amylase. The main properties of saliva amylase are: thermolability, specificity.
7. Determination of the activity of alpha-amylase of saliva by Volhemut. Alpha, beta and gamma amylases of saliva. The mechanism of their action. The effect of saliva pH on their activity. Saliva alpha-amylase activators and inhibitors. Determination of the activity of blood catalase.
8. Seminar on the topic: “Biological oxidation”
9. Module: "Enzymes and biological oxidation.
10. Qualitative reactions to vitamins A, D, B2, B12, PP, C. Quantitative determination of vitamin C in urine.
11. Module: "Vitamins"
12. Seminar: "Hormones"
13. Module: "Hormones"
14. Photosynthesis.
15. Quantitative determination of glucose in blood using the glucose oxidant method. Glucose tolerance test. Qualitative determination of glucose and ketone bodies in the urine of a patient with diabetes mellitus. A semi-quantitative method for determining glucose in urine using a “glucotest”. Method for polarimetric determination of glucose in the urine of a patient with diabetes mellitus.
16. Oxidative decarboxylation of pyruvate. Quantitative determination of pyruvate in urine.
17. Seminar on the topic: "Carbohydrate metabolism".
18. Module on the topic "Carbohydrate metabolism"
19. Digestion of lipids. Physicochemical properties of lipids. The influence of bile acids on the activity of pancreatic lipase.
20. Computer and molecular modeling of lipids and biological membranes. Seminar “Lipid metabolism”.
21. Module on the topic: “Lipid metabolism”.
22. Analysis of normal and pathological gastric contents. Qualitative reactions to hydrochloric and lactic acids. Protein digestion with pepsin.
23. Determination of histamine concentration in ampoule preparations. Analysis of the biological usefulness of the daily diet of amino acids. Qualitative and quantitative determination of ammonia and creatinine in urine.
24. Amino acid metabolism disorders. Discovery of phenylpyruvic and homogentisic acids in urine. Qualitative reactions to the discovery of protein in urine. Quantitative determination of protein in urine.
25. Module on the topic “Metabolism of simple and complex proteins”
26. Spectroscopic study of blood pigments. Buffer systems and total blood protein. Preparation of hemin crystals.

27. Quantitative determination of total, direct, indirect bilirubin in blood serum using the Jendraszek method. Qualitative reactions to blood and bile pigments in urine.
28. Seminar: “Detoxification of toxic substances in the body. The mechanism of neutralization of xenobiotics. Biotransformation of medicinal substances. Metabolism of ethanol."Vitamins that affect the metabolism of calcium and phosphorus.
29. Module on the topic “Blood and mineral metabolism.”
30. Physicochemical properties of urine. Computer control for knowledge of biochemical formulas. Certification.

Text books and required supplies:

Main:

1. Berezov T.T., Korovkin B.F. Biological chemistry. – M.: “Medicine”, 1998.
2. Nikolaev A.Ya. Biological chemistry. – M.: “Medical informational agency”, 2001.
3. Zubairov D.M., Timerbaev V.N., Davydov V.S. Medical Biochemistry. – Kazan, 2001.

Supplementary:

4. Wight A., Handler F. et al. The essentials of biochemistry: V. I, II, III. – M.: “Mir”, 1982.
5. Cruit G. Biochemistry. – M.: “Medicine”, 1979.
6. Marry R., Grinner D. et al. Human biochemistry: V. I, II. – M.: “Mir”, 1993.
7. Elliot V., Elliot D. Biochemistry and molecular biology. – 2000.
8. Biochemistry: A brief interpretation with exercises / Edit. by E.S. Severin & A.Ya. Nikolaev. – M.: “GEOTAR”, 2001.
9. Molecular principles of biological processes: from “Contemporary Natural Sciences” V.8 of Russian Encyclopedia / Edit. by Yu. A. Vladimirov. – M.: “Magistr-press”, 2000.
10. David E. Metzler Biochemistry.The Chemical Reactions of Living Cells.- V. I,II.- Academic Press,2003.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is

given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of module No. 1. Proteins and nucleic acids.

How many different amino acids are there?

A. 3
B. 20
C. 100
D. 74
E. 15

Which of the following amino acids has an amide side chain?

A. aspartic acid
B. leucine
C. ammonia
D. methionine
E. asparagine

Hydrophobic bonds are formed due to:

A. strong electrostatic interactions of charged group
B. medium electrostatic interactions due to electron density distribution
C. covalent interactions
D. weak interactions of instantaneous dipoles
E. magnetic interaction

Example of module No 2. Enzymes

Which of the following is NOT an enzyme?

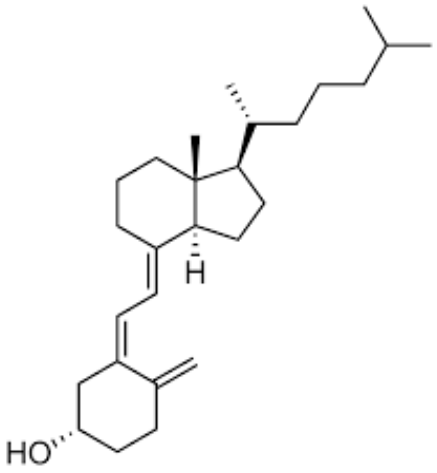
A. lipase

B. urease
C. maltose
D. ribonuclease
E. dehydrogenase

Each enzyme can speed up only one particular reaction. This specificity is due to the
A. specific shapes of both the enzyme and the substrate
B. lowering of the energy of activation
C. pH of the surrounding medium
D. temperature of the surrounding medium
E. permanent binding of the enzyme-substrate complex

The amount of energy (e.g., heat) needed for a reaction to occur is called the
A. kinetic energy
B. potential energy
C. synthetic energy
D. energy of deactivation
E. energy of activation

Example of module No. 3. Vitamins
The formula of which vitamin is shown in the figure:



A. vitamin D
B. vitamin A
C. vitamin K
D. vitamin C
E. vitamin B12

Which vitamin is not fat soluble?
A. vitamin A
B. vitamin C
C. vitamin D
D. vitamin K
E. vitamin E

Example of module No. 4. Hormones
Which hormone do the α-cells produce?
A. insulin
B. epinephrine
C. glucogen
D. thyroxine
E. none of the above

What does calcitonin cause?
A. a decrease in bone density
B. an increase in bone density

C. a decrease in blood calcium concentration
D. an increase in blood calcium concentrations
E. B and C

Which hormone speeds up the body's metabolism?
A. triiodthyronine
B. calcitonin
C. thyroxine
D. all of the above
E. A and C

Example of module No. 5. Carbohydrates metabolism
Which compounds are substrates of glycolytic oxidoreduction:
A. lactate
B. 3-phosphoglyceraldehyde
C. 1,3-diphosphoglyceric acid
D. glucose
E. phosphoenolpyruvate

What is the relationship between insulin and glycogen metabolism?
A. a decrease in cAMP level
B. inhibition of calmodulin
C. conversion of diacylglycerol to phosphoinositol diphosphate
D. isomerization of glucose-6-phosphate into glucose-1-phosphate
E. no correct answer

Example of module No. 6. Lipids metabolism
Which of the following statements doesn't describe phosphoglycerides correctly?
A. they are both amphipathic and amphoteric
B. they derive from phosphatic acid
C. they are found in cell membranes
D. they are a major store of metabolic energy
E. they contain two fatty acid tails

Complex lipid lecithin comprises different components EXCEPT
A. choline
B. phosphoric acid
C. glycerol
D. saturated fatty acid
E. sphingosine

The lipid that serves as a precursor of the second hormonal messengers is
A. cardiolipin
B. phosphatidylinositol
C. cholesterol

D. sphingomyelin
E. dipalmitoyl lecithin

Example of module No. 7. Proteins metabolism

Which of the following contributes nitrogen atoms to both purine and pyrimidine rings?

A. Tetrahydrofolate
B. Carbomoyl phosphate
C. Carbon dioxide
D. Glutamate
E. None of he above

Which of the following is a required substrate for purine biosynthesis?

A. 5-methyl thymidine
B. ARA C
C. Ribose phosphate
D. PRPP
E. 5-fluoro uracil

The conversion of inosine monophosphate:

A. to adenosine monophosphate (AMP) is inhibited by guanosine monophosphate (GMP)
B. to AMP requires uridine monophosphate (UMP)
C. to GMP requires GMP kinase
D. to GMP requires glutamate
E. to guanosine diphosphate (GPD) requires ribonucleotide reductase

Example of module No. 8. Blood

Which sequence of events is correct?

A. bilirubin – biliverdin – urobilinogen - heme – stercobilin
B. urobilinogen – bilirubin – biliverdin -heme– stercobilin
C. heme – bilirubin– biliverdin -stercobilin – urobilinogen
D. heme – biliverdin – bilirubin – urobilinogen – stercobilin
E. heme – stercobilin – bilirubin – urobilinogen – biliverdin

What is the most present combination of hemoglobin molecule chains in a fetus before delivery?

A. 2 ξ and 2 ε
B. 2 ξ and 2 ζ
C. 2 α and 2 ζ
D. 2 α and 2 γ
E. 2 α and 2 β

Iron in oxyhemoglobin has oxidation state close to:

A. -1
B. 0
C. +1
D. +2

E. +3

EVALUATION OF THE MODULE ANSWER

The module consists of 30 MSQ tasks. First 20 questions refer to the general knowledge of the topic – 3 points each; 60 points total. Next 10 questions refer to solving complicated problems, requires understanding both fundamental biochemical processes and the process of their application in clinical practice – 4 points each; 40 points in total.

Example of exam ticket:

Which hormone belongs to the class of amino acid derivatives
A. adrenalin
B. thyroxine
C. triiodothyronine
D. norepinephrine
E. all of them

What group does oxytocin belong to?
A. amino acid derivatives
B. steroid hormones
C. protein-peptide
D. none

Which hormone is produced in the pituitary gland?
A. corticoliberin
B. prolactostatin
C. serotonin
D. insulin
E. corticotropin

What hormone affects protein metabolism?
A. insulin
B. calcitonin
C. cortisol
D. estrogen
E. insulin and cortisol

Ehe effect of aldosterone is manifested in:
A. reabsorption of potassium ions
B. increased synthesis of fatty acids
C. decrease in hexokinase activity
D. reabsorption of sodium ions
E. reabsorption of potassium ions

Where is glucagon synthesized?

A. hepatocytes
B. alveolocytes
C. pancreatic alpha cells
D. cardiomyocytes
E. pancreatic beta cells

Diabetes mellitus may be caused by:

A. β-cell destruction, usually leading to absolute insulin deficiency
B. alpha-cell destruction, usually leading to absolute insulin deficiency
C. insulin secretory defect with insulin resistance
D. β-cell destruction, usually leading to absolute insulin deficiency or insulin secretory defect with insulin resistance
E. none

Tropic hormones:

A. affect the functioning of peripheral glands
B. produced by peripheral glands
C. produced by the pituitary gland
D. synthesized in the hypothalamus
E. affect the functioning of peripheral glands and produced by the pituitary gland

Hypothyroidism may be a clinical sign of:

A. Graves' disease
B. Hashimoto's disease
C. Pompe disease
D. diabetes
E. all of the above

l-thyroxine is used for the treatment:

A. of hyperthyroidism
B. of hypothyroidism
C. of adrenal hyperfunction
D. of adrenal hypofunction
E. all of the above

Oxytocin:

A. causes uterine contraction
B. causes relaxation of the uterus
C. is synthesized in the hypothalamus
D. affects progesterone synthesis
E. causes uterine contraction and is synthesized in the hypothalamus

The main effect of insulin is:

A. decreases blood sugar level
B. enhances lipogenesis

C. decreases blood sugar level and enhances lipogenesis
D. increases blood sugar level
E. none

Thyrotropin affects the production of:
progesterone
estrogen
thyroxine
corticosteroids
insulin

Insulin:
A. Is a protein
B. regulates carbohydrate metabolism
C. regulates fat metabolism
D. synthesized in the pancreas
E. Is a protein that regulates carbohydrate metabolism and fat metabolism and is synthesized in the pancreas

Lack of parathyroid hormone causes:
A. decreased mental ability
B. low blood calcium levels
C. high blood calcium levels
D. low phosphate levels
E. decreased mental ability and high blood calcium levels

Calcitonin is secreted in
A. thyroid gland
B. adrenal glands
C. parathyroid glands
D. pituitary gland
E. pancreas

Thyroid hormones
A. increase glycogenolysis
B. enhance glycolysis
C. enhance lipolysis
D. synthesized in the thyroid gland
E. increase glycogenolysis, enhance glycolysis, enhance lipolysis and are synthesized in the thyroid gland

Vasopressin:
A. Increases water reabsorption
B. lowers blood pressure
C. reduces calcium reabsorption

D. refers to releasing factors
E. Increases water reabsorption, lowers blood pressure, reduces calcium reabsorption, refers to releasing factors

Cushing's disease leads to:
A. enhanced lipogenesis
B. delayed lipogenesis
C. decreased glucose tolerance
D. high levels of phosphates
E. enhanced lipogenesis and decreased glucose tolerance

Which hormone deficiency leads to increased breakdown of fats, proteins and hyperglycemia?
A. insulin
B. calcitonin
C. adrenalin
D. estrogen
E. insulin and calcitonin

EVALUATION OF THE EXAM ANSWER
Exam consist of 100 questions for 2 variants. It's the multiple select type of questions for every topic that was studied during two semesters.

PHARMACOPOEIAL ANALYSIS IN PHARMACOGNOSY

Teachers: Ryumin Sergey Denisovich.
Building, Department, classroom: Institute of Pharmacy (Fatiha Amirhana street, 16) classroom 316,318.
Contact details:
- Telephone number: 89655934983 (Ryumin S.D.)
- E-mail address: ryumin-2000@list.ru

Total hours: 72 h.
Lectures – 10 hours;
Practical classes – 32 hours;
Independent work – 30 hours;

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.

Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (http://www.kgmu.kcn.ru:40404/moodle/login/ index.php).__

Tasks of the discipline.
Course objectives: The purpose of mastering the discipline
To provide students with the necessary knowledge, skills and abilities in the field of harvesting, acceptance, authentication and quality assessment of medicinal plant raw materials (MPR) and medicinal plant preparations (MPP).
Objectives of mastering the discipline:
- Formation of the ability to conduct acceptance of MPR and MPP, take samples required for analysis; use macroscopic and microscopic methods of analysis to determine the authenticity of MPR and MMP; use methods of phytochemical analysis to determine the authenticity and benignity of MPR and MMP in accordance with state quality standards, legislative and regulatory documents;
- Formation of the ability to conduct independent analytical, research work and perform individual research and scientific-applied tasks to develop new methods and technologies in the field of pharmacy.
Course topics:
Calendar plan of lectures

1. Sampling for analysis of MPR and MMP and determination of stock pest infestation, grindability, impurity content and weight deviation of package contents.
2. Determination of moisture content, ash content, ash insoluble in 10% hydrochloric acid and extractive substances in MPR and MMP.
3. Analysis of fresh raw materials. Analysis of collections.
4. Analysis of essential oils
5. Analysis of fatty oils.

Calendar plan of laboratory classes

1. Sampling for MPR analysis and determination of stock pest infestation, grindability and impurity content
2. Sampling for LRF analysis and determination of pulverization, impurity content and weight deviation of package contents
3. Determination of moisture content, ash content and extractive substances in FFA and FPR
4. Analysis of chopped collections
5. Analysis of powder collections
6. Analysis of essential oils
7. Analysis of fatty oils
8. Credit

Text books and required supplies:
Main literature:

1. William Charles Evans Trease and Evans Pharmacognosy/ William Charles Evans – 16 ed.: Saunders Ltd., 2009 — 2075 p.

2. European pharmacopoeia, 11 edition. Access mode: https://pheur.edqm.eu/home

Additional literature:

1. Kurkin V.A. Pharmacognosy: textbook – 2nd ed. additional and revised. - Samara: LLC "Etching", GOVPO "SamSMU Roszdrava", 2007. – 1239 p.
2. Pharmacognosy. Medicinal raw materials of plant and animal origin: a textbook / edited by G.P. Yakovlev. 2nd ed. ispr. and additional – St. Petersburg: SpetsLit, 2010. – 863 p

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other)
Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.
Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.
Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".
Overall student rating is build up from class attendance, module and test results, midterm assessment results.
Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

EXAMPLE OF CREDIT

Task 1

The receiving department of the warehouse of a pharmaceutical company received a batch of peppermint leaves packed in cloth bags with a total weight of 3120 kg. During the external inspection of the batch of raw materials, no bags with damaged packaging were found. Calculate

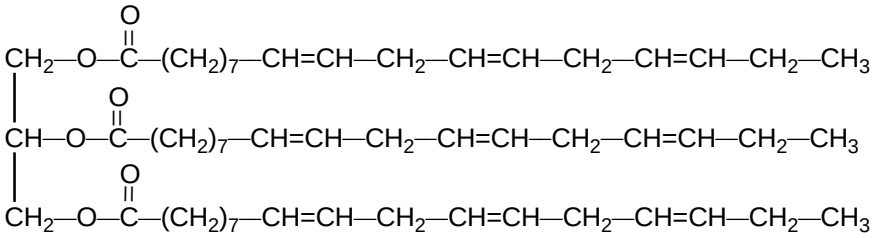
the sample volume for this batch of raw materials, specify the total number of point samples that will be taken to form a pooled sample, the minimum mass of the pooled sample, specify the masses of samples for determining microbiological purity, samples for determining the degree of infestation by stock pests, the average sample and analytical samples, samples for radiation monitoring.

Task 2

The pharmacy warehouse received a series of collection “Phytonephrol” in the amount of 95 boxes of 200 packs each. Calculate the sample volume for this series of LRP, specify the total number of packages that will be selected to form a pooled sample, the number of packages to determine the deviation of the weight of the contents of the package, specify the sample weights for determining microbiological purity, average sample and analytical samples, samples for radiation monitoring.

Task 3

What class of natural compounds belongs to the compound, the formula of which is given below?



According to SP XV (GPM.1.5.2.0002.15 “Fatty vegetable oils), one of the indicators of the quality of fatty oils is the iodine number. According to GPM.1.5.3.0005.15, the determination of the iodine number can be carried out by two methods using iodine monochloride or iodine bromide. Explain the methodology below for determining this indicator. Write down the possible chemistry of the reactions taking place in these methods. The value of this indicator for assessing the quality of the oil.

Method 1

An exact weighed portion of the test substance in the amount indicated in the table is placed in a dry conical flask with a ground-in stopper with a capacity of 250 ml, dissolved in 3 ml of ether or chloroform, 20.0 ml of iodine monochloride solution 0.1 M are added, the flask is closed with a stopper soaked in potassium solution iodide, gently shake and incubate in a dark place for 1 hour.

Add successively 10.0 ml of potassium iodide solution 10%, 50 ml of water and titrate with sodium thiosulfate solution with 0.1 M with constant vigorous shaking until the solution is light yellow. Add 3 ml of chloroform, shake vigorously, then add 1 ml of starch solution and continue titration until the solution becomes discolored. A control experiment is carried out under the same conditions.

The iodine number is calculated by the formula:

$$I_1 = \frac{0{,}01269 \cdot (V_2 - V_1) \cdot 100}{a},$$

where V1 is the volume of sodium thiosulfate solution 0.1 M, consumed for titration in the main experiment, ml; V2 is the volume of sodium thiosulfate solution of 0.1 M consumed in the control experiment, ml; a - weight of the test substance, g; 0.01269 - titer of sodium thiosulfate solution of 0.1 M for iodine, g / ml.

Task 4
The center for quality control of medicines received the essential oil of eucalyptus leaves for analysis. According to GPM.2.4.0002.18, among other indicators of the quality of the essential oil of eucalyptus leaves, the determination of the impurity of ethyl alcohol and water is provided. How SP XIV (GPM.1.5.2.0001.15) proposes to determine these impurities? Also, for the essential oil of eucalyptus leaves, the determination of impurities of volatile aldehydes (isovaleric, nylon, caprylic) is provided. Explain the method for determining aldehydes given below, write down the chemistry of the reactions taking place.
Eucalypti foliorum oleum aethereum (FS.2.4.0002.18)

Aldehydes. 10 ml of essential oil is placed in a 25 ml test tube with a ground stopper, 5 ml of toluene, 4 ml of hydroxylamine hydrochloride of a 5% alcohol solution are added, vigorously shaken for 5 minutes and left to separate the layers. Add 2 ml of 0.5 M alcoholic potassium hydroxide solution, shake vigorously again and leave to separate the layers; the bottom layer should have a color from slightly yellow to yellow without a pink tint.
Preparation of solutions

Hydroxylamine hydrochloride alcohol solution 5%. 5.0 g of hydroxylamine hydrochloride is weighed into a 100 ml volumetric flask, dissolved in 90 ml of 60% ethyl alcohol, 10 drops of methyl orange solution are added, neutralized with 0.5 M alcoholic potassium hydroxide solution and the volume of the solution is adjusted to the mark with 60% ethyl alcohol.

0.5 M solution of potassium hydroxide alcohol. Dissolve 14.0 g of potassium hydroxide in 300 ml of 95% ethyl alcohol in a 500 ml volumetric flask, add 150 ml of water, mix, cool to room temperature and bring the volume of the solution to the mark.

EVALUATION OF THE CREDIT ANSWER
There are 4 assignments in the credit. For each assignment 25 points are given.
Total 25 × 4=100 points.

METHODS OF PHARMACOPOEIAL ANALYSIS

Teacher: Ass. Prof. Alexandra V. Sitenkova
Building, Department, classroom # Amirkhana str., 16, Institute of Pharmacy, room 419

Contact details:
Telephone number: 521-16-42
E-mail address: aleksandra.sitenkova@kazangmu.ru

Office and working hours: 426 (9-17)

Total hours — 324:
- Lectures 40 hours;
- Practical classes 130 hours;
- Independent work 118 hours;
- Control 36 hours

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=2752).

Course objectives: The purpose of mastering the discipline

The goal of mastering the methods of pharmacopoeial analysis discipline is to provide students with the necessary knowledge, skills and abilities in quality control of medicinal products using pharmacopoeial analysis methods.

Tasks of the discipline:
-Students acquire knowledge of the theoretical foundations of pharmacopoeial analysis methods.
-Students study drug analysis using pharmacopoeial methods and evaluate their quality based on the results obtained. Ability to prepare reagents, titrated solutions and analyzed solutions.
-Students master the ability to solve a situational professional problem.
-Students develop practical skills in conducting drug quality control using pharmacopoeial methods based on the indicators stipulated by regulatory documents.
-Students develop practical skills in conducting tests using physicochemical and chemical methods of analysis.
-Students develop practical skills in interpreting test results using physicochemical and chemical methods of analysis.
-Students develop the ability to conduct independent analytical, research work and perform individual research and applied scientific tasks to develop new methods and technologies in the field of pharmacy.

Course topics:
Calendar plan of lectures

1. Structure of the State Pharmacopoeia. General provisions: pharmaceutical substances, reference materials, residual organic solvents, polymorphism, crystallinity. Titrated solutions.
2. Validation of analytical methods.
3. Acid-base titration in aqueous and mixed media. Preparation of titrated solutions. Application in pharmaceutical analysis.
4. Acid-base titration in non-aqueous media. Preparation of titrated solutions. Application in pharmaceutical analysis.
5. Redox titration. Preparation of titrated solutions of potassium permanganate, potassium dichromate, iodine, sodium thiosulfate, sodium nitrite. Application in pharmaceutical analysis. Definition of water.
6. Redox titration. Preparation of titrated solutions of potassium bromate, potassium iodate, bromide-bromate solution, solutions of cerium(IV), copper(II), iron(II) and iron(III) salts. Application in pharmaceutical analysis.
7. Complexometric titration. Preparation of titrated solutions. Indicators. Application in pharmaceutical analysis (compounds of aluminum, bismuth, calcium, magnesium, lead, zinc).
8. Precipitation titration. Preparation of titrated solutions. Indicators. Application in pharmaceutical analysis.
9. Identification and quantification of organoelement drugs. Method of combustion in a flask with oxygen. Kjeldahl method, formal titration. Application in pharmaceutical analysis.
10. Ionometry. Potentiometric titration. Amperometric titration. Electrical conductivity. Theoretical basis. Application in pharmaceutical analysis.
11. Refractometry. Theoretical basis. Analysis of single and multicomponent systems. Application in pharmaceutical analysis.
12. Polarimetry. Theoretical basis. Application in pharmaceutical analysis.
13. Photocolorimetry. Theoretical basis. Application in pharmaceutical analysis. Spectrophotometry. Theoretical basis. Application in pharmaceutical analysis.
14. Spectrometry in the IR and near IR region. Theoretical basis. Application in pharmaceutical analysis.
15. Fluorimetry. NMR spectroscopy. Theoretical basis. Application in pharmaceutical analysis.
16. Raman spectrometry. X-ray powder diffractometry. Theoretical basis. Application in pharmaceutical analysis.
17. Chromatography on paper, thin layer chromatography, ion exchange chromatography. Theoretical basis. Application in pharmaceutical analysis.
18. Gas chromatography. Theoretical basis. Application in pharmaceutical analysis.
19. High performance liquid chromatography. Theoretical basis. Application in pharmaceutical analysis.
20. Gravimetry. Thermogravimetry. Differential thermal analysis, differential scanning calorimetry. Thermomicroscopy. Theoretical basis. Application in pharmaceutical analysis.

Calendar plan of laboratory classes

1. Topic 1.1. The structure of the State Pharmacopoeia. General provisions of the State Pharmacopoeia: pharmaceutical substances, standard samples, residual organic solvents, polymorphism, crystallinity. Titrated solutions, volumetric glassware.
2. Topic 1.2. Validation of analytical procedures. Statistical processing of experimental results.
3. Topic 2.1. Acid-base titration in aqueous and mixed media. Preparation of titrated solutions. Application in pharmaceutical analysis. Indicators.
4. Topic 2.2. Acid-base titration in non-aqueous media. Preparation of titrated solutions. Indicators. Application in pharmaceutical analysis.
5. Topic 2.3. Redox titration. Preparation of titrated solutions of potassium permanganate, potassium dichromate, iodine, sodium thio-sulfate, sodium nitrite. Indicators. Application in pharmaceutical analysis. Determination of water.
6. Topic 2.4. Redox titration. Preparation of titrated solutions of potassium bromate, potassium iodate, bromide-bromate solution, solutions of salts of cerium (IV), copper (II), iron (II) and iron (III). Indicators. Application in pharmaceutical analysis.
7. Control by topics 1.1. - 2.4.
8. Topic 2.5. Complexometric titration. Preparation of titrated solutions. Indicators. Application in pharmaceutical analysis (compounds of aluminum, bismuth, calcium, magnesium, lead, zinc).
9. Topic 2.6. Precipitation titration. Preparation of titrated solutions. Indicators. Application in pharmaceutical analysis.
10. Topic 2.7. Oxygen flask combustion method. Application in pharmaceutical analysis.
11. Topic 2.8. Kjeldahl method, formol titration. Application in pharmaceutical analysis.
12. Control by topic 2.5. - 2.8.
13. Topic 3.1. Ionometry. Potentiometric titration. Amperometric titration. Electrical conductivity. Theoretical basis. Application in pharmaceutical analysis.
14. Topic 3.2. Refractometry. Theoretical basis. Analysis of single and multicomponent systems. Application in pharmaceutical analysis.
15. Topic 3.3. Polarimetry. Theoretical basis. Application in pharmaceutical analysis.
16. Control by topic 3.1. - 3.3.
17. Final control for the 4th semester.
18. Topic 3.4. Photocolorimetry. Theoretical basis. Application in pharmaceutical analysis.
19. Topic 3.5. Spectrophotometry. Theoretical basis. Application in pharmaceutical analysis.
20. Topic 3.6. Spectrometry in the IR and near IR region. Theoretical basis. Application in pharmaceutical analysis.
21. Topic 3.7. Fluorimetry. NMR spectroscopy. Theoretical basis. Application in pharmaceutical analysis.
22. Topic 3.8. Raman spectrometry. X-ray powder diffractometry. Theoretical basis. Application in pharmaceutical analysis.
23. Control of topics 3.4.-3.8
24. Topic 3.9. Chromatography on paper, thin layer chromatography, ion exchange chromatography. Theoretical basis. Application in pharmaceutical analysis.
25. Topic 3.10. Gas chromatography. Theoretical basis. Application in pharmaceutical analysis.

26. Topic 3.11. High performance liquid chromatography. Theoretical basis. Application in pharmaceutical analysis.
27. Topic 3.12. Gravimetry. Thermogravimetry. Differential thermal analysis, differential scanning calorimetry. Thermomicroscopy. Theoretical basis. Application in pharmaceutical analysis.
28. Control of topics 3.9.-3.12.
29. Final control of 4 and 5 semesters

Text books and required supplies:

1. Pharmaceutical chemistry : textbook / ed. G. V. Ramenskaya. - Москва : ГЭОТАР-Медиа, 2023. - 384 с. - ISBN 978-5-9704-7240-8, DOI: 10.33029/9704-7240-8-PCH-2023-1-384. - Электронная версия доступна на сайте ЭБС "Консультант студента" : [сайт]. URL: https://www.studentlibrary.ru/book/ISBN9785970472408.html

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – “poor”, 70-79 – “satisfactory”, 80-89 – “good”, 90-100 – “excellent”.

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes

- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of Control by topics 1.1. - 2.4.

2. Calculate the correction factor for 0.1 M sodium hydroxide solution if 22.00 mL of 0.1 M HCl solution was consumed for titration of 20.00 mL (K=0.9998). If necessary, calculate the volume of water or the mass of NaOH required to dilute or strengthen 300.00 mL of the prepared solution (20 points).
3. Alkalimetry. Quantitative determination of ascorbic acid (reaction, medium, indicator, equivalence factor for titrant and analytical substance, calculation formulas for titer (T), and content of substance in %) (20 points).
4. Acidimetry. Quantitative determination of sulfacyl sodium (reaction, medium, indicator, equivalence factor for titrant and analytical substance, calculation formulas for titer (T), and content of substance in %) (20 points).
5. Acid-base titration in non-aquaous medium. Quantitative determination of metronidazole (reaction, medium, indicator, titrant) (20 points).
6. Iodometric titration. Quantitative determination of cooper (II) sulfate (reaction, medium, indicator, equivalence factor for titrant and analytical substance, calculation formulas for titer (T), and content of substance in %) (20 points).

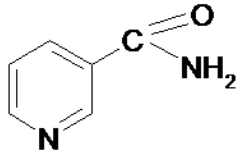
Example of Control by topic 2.5. - 2.8.

1. Complexonometric titration. Quantitative determination of Ca^{2+} salts (reactions, medium, indicator, equivalence factor, formulas for calculation titer (T) and content of substance in %) (25 points).

2. Argentometric titration. Mohr method. Quantitative determination of sodium bromide (reactions, medium, indicator, equivalence factor, formulas for calculation titer (T) and content of substance in %) (25 points).

3. The oxygen flask combustion method. Principle of the method (25 points).

4. Modified Kjeldahl method. Determination of Nicotinamide (equations, equivalence factor, indicator) (25 points).



Example of Control by topic 3.1. - 3.3.

1. Ionometry. Definition. Application in pharmaceutical analysis (20 points).

2. Refractive index. Definition. (20 points).

3. Polarimeter. Give diagram of the device and name main parts (20 points).

4. Calculate the concentration of sodium bicarbonate solution, if at 23 ºC the refractive index of sodium bicarbonate solution is 1.3437, water - 1.3327 (F=0.00125) (20 points).

5. Calculate the specific rotation of ethinyl estradiol if the optical rotation of the polarized light of a 1% solution in dioxane was + 0.06 °, the length of the cuvette was 19.89 cm. (20 points).

Example of Control by topic 3.4.-3.8

1. IR-spectroscopy. Preparation of samples for analysis (20 points).
2. NMR spectroscopy. Definition. Qualitative analysis (20 points).
3. Spectrophotometry. Methods of determination concentration (20 points).
4. Raman-spectroscopy. General principles (20 points).
5. Calculate the content of furazolidone in tablets if a weighed portion of the powder of ground tablets weighing 0.1004 g was dissolved in a 25 ml volumetric flask. 0.6 ml of the resulting solution was brought to the mark with water in a 100 ml volumetric flask. The absorbance of this solution at 360 nm in a cuvette with a layer thickness of 0.5 cm was 0.49. The extinction coefficient is 985. The average weight of 1 tablet is 0.101 (10 points).
6. Make a conclusion about the quality of prednisone if the absorbance of a 0.001% solution in 95% alcohol at a wavelength of 241 nm was 0.530; the absorbance of the standard solution (0.001%) at the same wavelength is 0.520. According to the monograph, the prednisolone content should be from 96.0 to 104.0% (10 points).

Example of Control of topics 3.9.-3.12.

1. Thin-layer chromatography. Theoretical bases. Application in pharmacopoeal analysis.
2. Thermogravimetric analysis. Theoretical bases. Application in pharmacopoeal analysis.
3. The sample of mint oil was chromatographed. The chromatogram has the following peaks: 1st (not identified) with an area of 113 mm^2, 2nd (not identified) - 225 mm^2, 3rd (menton) - 246 mm^2, 4th (menthyl acetate) - 384 mm^2, 5th (menthol) - 1130 mm^2. Calculate the free menthol content of the sample.
4. According to regulatory documentation, technical turpentine should contain at least 60% of the amount of peneens. There are different peaks on the chromatogram of sample: α-pinene with an area of 1993 mm^2, β-pinene - 1068 mm^2, camphene - 863 mm^2, bornyl acetate - 158 mm^2, and the remaining peaks with a total area of 296 mm^2. Does the sample comply with regulatory requirements?
5. Comparative analysis of substances was carried out by gas chromatography on two analytical columns. On the first column, the retention time was 11.6 minutes, the peak width at half height was 0.45 minutes, the second column had a retention time of 8.1 minutes, and the peak width at half height was 0.67 minutes. Which column is more effective?
6. Evaluate the quality of chromatographic columns at a height equivalent to theoretical plates. For the 1st column: the column length is 1210 mm, the number of theoretical plates is 1355. For the 2nd column: the column length is 2450 mm, the number of theoretical plates is 1580.

Example of examination task

1. Acidimetry. Quantitative determination of codeine (reaction, medium, indicator, equivalence factor for titrant and analytical substance, calculation formulas for titer (T) and content of substance in %) (15 points)

2. Permanganatometric titration. Quantitative determination of hydrogen peroxide (reaction, medium, indicator, equivalence factor for titrant and analytical substance, calculation formulas for titer (T) and content of substance in %) (15 points)
3. The oxygen flask combustion method. Principle of the method (10 points).
4. Polarimetry. Definition. Application in pharmaceutical analysis (10 points).
5. Thermogravimetric analysis. Theoretical bases. Application in pharmacopoeal analysis (10 points).
6. Calculate the correction factor for 0.1 M potassium hydroxide solution if 25.01 ml of 0.1 M HCl solution was consumed for titration of 20.0 ml (K=0.9800). If necessary, calculate the volume of water or the mass of KOH required to dilute or strengthen 300.0 ml of the prepared solution (15 points).
7. Calculate the specific rotation of ethinyl estradiol if the optical rotation of the polarized light of a 1% solution in dioxane was + 0.06 °, the length of the cuvette was 19.89 cm (10 points).
8. According to regulatory documentation, technical turpentine should contain at least 60% of the amount of peneens. There are different peaks on the chromatogram of sample: α-pinene with an area of 1993 mm^2, β-pinene - 1068 mm^2, camphene - 863 mm^2, bornyl acetate - 158 mm^2, and the remaining peaks with a total area of 296 mm^2. Does the sample comply with regulatory requirements? (15 points)

BIOETHICS AND LEGISLATION

Teachers: assistant professor I.L. Maximov, senior teacher V.A. Shcherbakov
Building, Department, classroom # NUK, Department of Biomedical ethics, Medical Law and History of Medicine, 317, 319, 322

Contact details:
Telephone number: (843) 236-39-91 (department of biomedical ethics, medical law and history of medicine)
E-mail address: biopravo@kazangmu.ru
Office and working hours: 326 (8-17)

Class hours:	108 h
Lecture hours	14 h
Practical classes	40 h
Self-study hours	54 h

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Practical classes are aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.

Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=1772).__

Course objectives:

The goals of mastering the discipline legal and ethical foundations in medical activity are:
identifying ethical problems in medicine and biology;
giving a rational justification for ethical decisions;
applying ethical principles in the assessment and solution of the specific problem situations of modern medical practice.

Tasks of the discipline:

To form knowledge in the field of:
- understanding the main ethical problems in medicine and biology;
- studying methods of solving of the main ethical problems in medicine and biology;
- forming rational justification for ethical decisions;
- applying ethical principles in the assessment and solution of the specific problem situations of modern medical practice

Course topics:

Calendar plan of lectures

1. History and philosophy of ethics, bioethics
2. What is bioethics
3. The Relationship Between the Doctor and the Patient in the 21st century
4. Social, legal and ethical aspects of the beginning of life.
5. Social, legal and ethical aspects of the end of human life
6. Ethical-legal problems of transplantation and transfusion medicine.
7. The principles of the UNESCO Universal Declaration on bioethics

Calendar plan of practical classes

1. Ethics and moral. What is ethics? What is bioethics?
2. What is bioethics? Human dignity and human rights.
3. Human dignity and human rights. Benefit and harm
4. The autonomy of the individual and individual responsibility
5. Informed consent. The persons who do not have legal capacity to give consent
6. Privacy and confidentiality. Equality, justice and equity
7. Equality, justice and equity. Non-discrimination and stigmatization.
8. Social responsibility. Module control work №1.
9. Social, legal and ethical aspects of the beginning of life.
10. Social, legal and ethical aspects of the end of human life
11. Ethical-legal problems of transplantation and transfusion medicine.
12. Ethical-legal problems of HIV-infection.
13. Ethical-legal problems of modern methods of intervention in human nature. Experimental medicine. Ethical and legal issues.
14. The principles of the "universal Declaration on bioethics and human rights" UNESCO in the conduct of biomedical experiments
15. Module control work №2. Final test

Text books and required supplies:
Legal and ethical foundations in medical activity. Nezhmetdinova F.T., Guryleva M.E., Maximov I.L. Kazan, 2019. – 156 p.

Evaluation and grading:
Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of module No. 1. Propaedeutic bioethics

1. The concept of bioethics of the following definition corresponds most:
    a. the science of survival; "the bridge between biology and ethics" (Potter);

b. ethics of the doctor;
c. deontology;
d. medical ethics;
e. cultural studies

2. Contract model between doctors and patients have the type of relationship
a. colleagues to each other;
b. husband and wife;
c. the seller and the buyer;
d. the father and the son;
e. engineer and the mechanism.

3. Morality is ...
a. the totality of scientific tests;
b. the criterion of "good-evil" attitude and norms of people in culture;
c. the form of the "objective unconscious", which indicates the due;
d. philosophical doctrine;
e. strict observance of the laws and the Constitution.

4. Biomedical ethics and medical law must be able:
a. medical law is a priority;
b. independence;
c. biomedical ethics is a criterion for medical law;
d. medical law determines the correctness of biomedical ethics;
e. should be kept a priority biomedical ethics.

Example of module No. 2 on the section of clinical bioethics

1. Medical mistakes are:
a. unfavorable outcomes associated with the refusal of a competent patient from appropriate treatment;
b. the unfavorable outcomes associated with random circumstances that a conscientious physician could not foresee and prevent;
c. the negligent perform of a doctor's duties;
d. honest mistakes of the doctor in diagnosis, technique, treatment, surgery;
e. the unfavorable outcomes associated with the refusal of a competent patient from an adequate examination.

2. Transplantation can be performed without the consent of the donor, if the donor:
a. retarded;
b. the deceased man, who left the document for the use of its organs;
c. incurable disease;
d. a particularly dangerous criminal, sentenced to life imprisonment;
e. citizen of another state.

3. The main ethical principles of human research does not apply:
a. risk/benefit ratio;
b. low social status of the patient;
c. informing the patient;
d. scientific substantiation of the project;
e. obtaining consent.

4. Euthanasia in Russia:

a. allowed in exceptional cases;
b. the law on euthanasia is under discussion;
c. there is no the law on euthanasia in the Russian legislation;
d. prohibited by law;
e. permitted by law.

EVALUATION OF THE MODULE ANSWER
The question card of the module consists of 10 multiple choice questions.
Each question is evaluated by 10 points.
Total: 10 x 10 = 100 points.

Scale of marks:
10 correct answers – 100 p.
9 correct answers – 90 p.
8 correct answers – 80 p.
7 correct answers – 70 p.
6 and less correct answers – 60 p. (not passed).

INFORMATION TECHNOLOGY IN PROFESSIONAL ACTIVITY

Teachers: Leysan Motygullina
Building, Department, classroom # Institute of Pharmacy, educational pharmacy, lecture hall 1
Contact details:
Telephone number: 89196270016 (Leysan Motygullina)
E-mail address: mleisi20@mail.ru
Office and working hours: 402 (9-17)

Total hours — 108:
- Lectures 16 hours;
- Practical classes 45 hours;
- Independent work 47 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=2829).

Course objectives: The purpose of mastering the discipline

The goals of mastering the Information technologies in professional activities discipline:
- formation of students' systemic knowledge, skills and abilities, including:
- familiarity with modern information and computer technologies;
- formation of knowledge and skills on modern approaches to the collection of pharmaceutical information;
- development and application of computer products in practical pharmacy;
- familiarization with the possibilities of machine learning and artificial intelligence in the field of development

Tasks:

1. Justification of the development and use of modern computer technologies for the management of drug care and its quality;
2. Orientation in the information field of the pharmaceutical market and analysis of the necessary pharmaceutical information.

Course topics:

Calendar plan of lectures

1. Topic 1.1. The specifics of pharmaceutical information. Informatization in the field of drug circulation: current trends and opportunities.
2. Topic 1.2. – 1.3. Information retrieval and information reference systems in pharmacy and medicine. Information retrieval systems in research work.
3. Topic 2.1. Information support of the life cycle of medicines. CALS-PLM technologies.
4. Topic 2.2. The Federal State Information System for monitoring the movement of medicines (FGIS MLP). The State Register of Medicines (GRLS).
5. Topic 3.1. Automation of accounting operations in pharmacy organizations.
6. Topic 3.2.-3.3. Information and computer technologies for drug care management. Program 1C: Pharmacy.
7. Topic 4.1.-4.2. Big data in medicine and pharmacy. The use of artificial intelligence in the development of medicines and medicine.
8. Topic 4.3. Application of machine learning in drug development and medicine.

Calendar plan of practical classes

1. Topic 1.1. The specifics of pharmaceutical information. Informatization in the field of drug circulation: current trends and opportunities.
2. Topic 1.2. Information retrieval and information reference systems in pharmacy and medicine
3. Topic 1.2. Information retrieval and information reference systems in pharmacy and medicine
4. Topic 1.3. Information retrieval systems in research work.
5. Topic 2.1. Information support of the life cycle of medicines. CALS/PLM technologies.
6. Topic 2.2. The Federal State Information System for monitoring the movement of medicines (FGIS MDLP). State Register of Medicines (GRLS).
7. Topic 3.1. Automation of accounting operations in pharmacy organizations.
8. Topic 3.1. Automation of accounting operations in pharmacy organizations.
9. Topic 3.2. Information and computer technologies for drug care management.
10. Topic 3.3. Program 1 C: Pharmacy.

11. Topic 3.4. Control work on topics 1.1-3.3.
12. Topic 4.1. Big data in medicine and pharmacy.
13. Topic 4.2. The use of artificial intelligence in the development of medicines and medicine.
14. Topic 4.3. Application of machine learning in drug development and medicine.
15. Topic 4.4. Credit lesson.

The main literature:

1. Pharmacy informatics / editors: Philip O. Anderson, Susan M. McGuinness, Philip E. Bourne. - CRC Press is an imprint of Taylor & Francis Group, an Informa business – 310 p.
2. Sitenkova, Aleksandra Viktorovna. Information technology in professional activity : educational and methodological manual for students studying in the specialty «Pharmacy» in English / A. V. Sitenkova, L. I. Motygullina ; Kazan State Medical University Ministry of health of the Russian Federation, Institute of Pharmacy. - Kazan : KSMU, 2024. - 50 p.

Additional literature:

1. Management and economics of pharmacy: textbook / E.A. Maksimkina et al.; edited by N. V.L. Bagirov. – M.: Medicine, 2004. - 716 p.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Evaluation and grading:

Intermediate certification is a credit.

Level 1 – assessment of knowledge

The following types of control are used to evaluate learning outcomes in the form of knowledge:

— test;

Examples of tasks:

1. The decision support system refers to:

a) automated control systems;

b) information retrieval systems;

c) information and reference systems;

d) expert systems;

e) none of the above classes of computer technology

2. Specify the correct correspondence of terms and definitions:

A. GTIN (Global Trade Item Number)
B. SSCC (Serial Shipping Container Code)
V. PAK
a. the serial code of the transport package, represented as a digital number. The code allows you to individually route the movement of a logistics unit and automate transport and warehouse operations
. b. a unique international code for labeling and accounting of logistics units, which allows you to identify at least the manufacturer, the trade name of the drug, the dosage form, the dosage of the drug and the completeness of the packaging of the drug.
b. a hardware and software complex including an order management system (OMS) and a device emission of marking codes (RE), which provides automated interaction with the system operator in terms of ordering and receiving marking codes for the formation of identification tools.
3. The means of continuous information support for the supply and life cycle of products are:
a) CALS technologies;
b) PLM technologies
Evaluation criteria:
The score on the test is set in proportion to the proportion of correct answers:
90-100% - score "excellent"
80-89% - score "good"
70-79% - score "satisfactory"
Less than 70% of correct answers – score "unsatisfactory".

— oral interview;
Examples of tasks:
1. The specifics of pharmaceutical information.
2. Classification of information and computer technologies.
3. Prospects for the use of information and computer technologies in scientific research and practical pharmacy.
4. Automation of accounting operations in pharmacy organizations.
5. Accounting of inventory items in pharmacy organizations with the help of modern automated control systems. 1C program: accounting.
6. The principle of operation of the federal state information system for monitoring the movement of medicines
7. The concept of machine learning.
Evaluation criteria:
"Excellent" (90-100 points) – the oral message answers the question in full, the correct interpretation of the terms is given, the key questions are considered.
"Good" (80-89 points) – the oral message answers the question in full, the correct interpretation of the terms is given, the key issues of the topic are partially considered.
"Satisfactory" (70-79 points) – the oral message answers the question posed, but not in full, the correct interpretation of the terms is given, the key issues of the topic are partially considered.

"Unsatisfactory" (0-69 points) – the oral message does not answer the question posed, the terms are misinterpreted, the key issues of the topic are not touched upon.

Level 2 – assessment of skills

The following types of control are used to evaluate learning outcomes in the form of skills:

— situational task;

Examples of tasks:

Task number 1

To develop a questionnaire on the need for pharmaceutical information for various consumer groups (doctors, pharmacists, the population).

Task number 2

Two pharmacies of the same organization are located in different rooms of the same building, in the case of moving medicines between these pharmacies, is it necessary to transfer information to the MDLP information system?

Evaluation criteria:

"Excellent" (90-100 points) – the use of an adequate example, references to the knowledge gained in the course, a scientific explanation of your point of view.

"Good" (80-89 points) – using an adequate example, without references to the knowledge gained in the course, a scientific explanation of one's point of view.

"Satisfactory" (70-79 points) – the use of a poorly relevant example, without references to the knowledge gained in the course, a scientific explanation of one's point of view.

"Unsatisfactory" (0-69 points) – using an inadequate example, without references to the knowledge gained in the course and without a scientific explanation of the point of view.

Level 3 – assessment of skills

The following types of control are used to evaluate learning outcomes in the form of skills:

— practical work;

Examples of tasks:

Task number 1

The patient is going to purchase the drug, but before that he asked to read the annotation. After seeing a large number of contraindications, he refused to purchase this medicine.

What should the pharmacist do in this case and what should he explain to the patient?

Task number 2

Search for information in the PubMed system and make a report on the topic "The use of NSAIDs in pediatrics", using the main tools of the proposed system: MeSN Database, <url> Reviews, Case List, etc.

Task number 3.

Generate a report based on the results of an information search in the DrugBank system for the drug "Diclofenac sodium".

Evaluation criteria:
"Excellent" (90-100 points) – the answer is correct, scientifically reasoned, with links to the topics covered.
"Good" (80-89 points) – the answer is correct, scientifically reasoned, but without references to the topics covered.
"Satisfactory" (70-79 points) – the answer is correct, but not scientifically reasoned, or the answer is
It is incorrect, but an attempt is presented to substantiate it from alternative scientific positions covered in
the course.
"Unsatisfactory" (0-69 points) – the answer is incorrect and not scientifically substantiated.

ELECTIVE DISCIPLINES IN PHYSICAL EDUCATION AND SPORTS

Teacher: PhD, Arthur Rustemovich Zalyaev
Building, Department, classroom #: NUK, 1floor, Sport gum, Department of physical education and health
Contact details:
- Phone: +7 9172343230 (Arthur Zalyaev)
- E-mail: artur.zalyaev@kazangmu.ru
- Office and working hours: NUK. 1floor, Sport gum, Department of physical education and health (15:00–20:00)

Class hours:
Total: 328 hours
Practical classes –328 hours

Course description:
The Physical Training course aims to promote the physical health and development of pharmacy students. It emphasizes aerobic endurance, strength, flexibility, and agility necessary for professional effectiveness and mental resilience in the pharmacy profession. Practical sessions incorporate cardio, resistance training, stretching, and coordination activities aligned with physical activity guidelines.
Physical training is a practical discipline promoting general physical development and health maintenance, crucial for the physical and mental endurance required in pharmacy practice. It includes aerobic and strength-based activities, functional fitness routines, and knowledge of safe training principles to prevent musculoskeletal disorders.
Course objectives:
- Enhance physical fitness to meet occupational demands
- Reduce risk of postural-related disorders
- Develop healthy lifestyle habits

- Improve mental well-being and stress resilience

Tasks of the discipline:
- Develop endurance, strength, flexibility, and coordination
- Promote awareness of one’s physical capabilities
- Instill regular exercise practices
- Assess and improve individual fitness levels

Course topics:
Calendar plan of practical classes:

Week	Topic
1	Introduction, fitness screening, safety in physical training
2	Development of aerobic endurance; Cooper and Ruffier tests
3	Running/walking endurance training and methods (continuous, interval)
4	Strength training fundamentals: basic techniques, muscle groups
5	Strength testing (core, back, shoulder, upper/lower body)
6	Flexibility and coordination development
7	Posture, ergonomics, and injury prevention for dentists
8	Strength circuit with resistance bands/bodyweight
9	Functional fitness and balance training
10	Development of individualized training plan
11	Aerobic load planning and 'safety zone' heart rate monitoring
12	Breathing and recovery techniques for stress relief
13	Power-focused exercises and plyometrics
14	Final endurance and strength re-testing
15	Presentation of fitness diary, reflection, and discussion

Self-training assignments:
Task 1:
- Create and perform a weekly endurance-focused workout plan
- Evaluate endurance using Ruffier or Cooper Test
- Complete self-control questionnaire on endurance

Task 2:
- Create and perform a strength-focused workout plan
- Assess strength using core/back/shoulder muscle endurance tests
- Complete self-control questionnaire on strength training

Textbooks and required materials:

1. Grishina, Yu.I. General Physical Preparation. Rostov-on-Don: Phoenix, 2010
2. Delavier, F. Anatomy of Strength Exercises

3. Materials on the university Moodle portal: http://www.kgmu.kcn.ru:40404/moodle/login

Evaluation and grading:
- Attendance and participation – 30%
- Practical test results (Cooper/Ruffier, strength tests) – 30%
- Task reports and fitness diary – 20%
- Final fitness evaluation and self-reflection – 20%

Grading scale (100 points)
- 90–100: Excellent
- 80–89: Good
- 70–79: Satisfactory
- Below 70: Unsatisfactory

Classroom rules:
- Attend classes in proper sports attire
- Respect equipment and peers- Follow instructions and safety regulations
- Be active, punctual, and motivated
- Use phones only during breaks
- Maintain personal hygiene and clean training spaces

Task 1

The purpose of the topic is to master the methods of development and assessment of physical qualities.
As a result of completing this task, students should:
- know the methodological features of the development of physical qualities;
- be able to independently compose a set of physical exercises for the development of physical qualities;
- have the ability to assess general physical fitness.

To achieve the goal and solve problems, it is necessary, relying on the following theoretical and methodological materials and recommended literature:
1. Make up a set (list) of exercises for the development of physical quality of endurance (perform this set for practically no less than the number of lessons on schedule, observing safety rules!).
2. Evaluate the level of endurance development according to the Rufier test or Cooper's test.
3. Answer questions for self-control

TOPIC: STUDENT'S PHYSICAL READINESS

General physical training is a process of improving physical qualities, aimed at the all-round physical development of a person. General physical fitness also helps to expand the functional

capabilities of the body, which leads to better adaptation of the body to changing environmental conditions.

The tasks of general physical training include:

- ensuring a comprehensive and harmonious physical development of the human body through the education of basic physical qualities (endurance, strength, speed, flexibility, agility);
- health promotion due to the development of the basic body systems (cardio-respiratory, neuromuscular);
- creation of a base for special physical training in professional or sports activities.

Physical education "methods" are ways of applying physical exercise. It is customary to understand the "methodology" as a system of means and methods aimed at achieving a certain result (table).

General physical training is a process of improving physical qualities, aimed at the all-round physical development of a person. General physical fitness also helps to expand the functional capabilities of the body, which leads to better adaptation of the body to changing environmental conditions.

The tasks of general physical training include:

- ensuring a comprehensive and harmonious physical development of the human body through the education of basic physical qualities (endurance, strength, speed, flexibility, agility);
- health promotion due to the development of the basic body systems (cardio-respiratory, neuromuscular);
- creation of a base for special physical training in professional or sports activities.

Physical education "methods" are ways of applying physical exercise. It is customary to understand the "methodology" as a system of means and methods aimed at achieving a certain result (table).

Training method name	Conditions of load and rest	Facilities
Continuous uniform	* Uniform intensity (power) work	Long exercise
Continuous variable	* Stepwise increasing load. * Fartlek - includes periodic accelerations	
Interval (long, medium and short interval)	* The ratio of load and rest is strictly prescribed, the rest interval is indicated	Interval exercise
Repeated	* The duration of the load is predetermined, the rest interval is not strictly indicated (until complete or almost complete recovery). * Gradually increasing load with rest intervals.	

Game	* According to the scenario of the game	Game exercise

I. Topic section: Endurance. Development and control methods

Endurance is the ability of a person to perform work for a considerable time without reducing the power of the load, its intensity, or as the body's ability to resist fatigue.

General endurance (aerobic performance) is the totality of the body's functional capabilities that determine its ability to perform any muscle work for a long time with high efficiency. Aerobic performance affects not only overall physical performance, but also mental, psychological, and performance of those body systems that provide resistance to disease-causing effects. It is believed that the system of "aerobics" is available for almost all contingents of the population and that it is the aerobic nature of physical exercises that gives them a special health-improving value.

Form - cyclic and acyclic loads. Cyclic exercises of a locomotive (locomotive) nature are repeated repetitions of stereotyped types of movements, relatively constant speed of movement and power (running, walking, swimming, skiing and cycling, etc.). For acyclic exercises, changes in power are characteristic in the course of their implementation, as well as a sharp change in the nature of motor activity (gymnastic and acrobatic exercises, sports games and martial arts, etc.).

Content: aerobic orientation of physical activity, i.e. any physical activity involving large muscle groups (1/2 - 2/3 of the total muscle mass), which can be performed rhythmically and continuously.

Duration: The recommended duration of a training session is 20-60 minutes of continuous aerobic work.

Methods:

- uniform continuous method;
- variable continuous method;
- interval method.

A common methodological feature during aerobic training (AN) is the elimination of possible pathological changes - regional or focal hypertonicity in segmental and associative muscles associated with the heart. The impact on them can be called special exercises:

a) segmental muscles (left) - trapezius, scalene, sternocleidomastoid, intercostal, diaphragm lifting the scapula, large and small rhomboid, supra- and infraspinatus, large round, broadest, spine straightener (upper third), small and large pectoral, upper posterior dentate, rectus abdominis, external oblique, iliac, deltoid, triceps shoulder, extensors of the hand, extensors of the fingers, flexors of the fingers, small muscles of the hand and fingers;

b) associative muscles - lumbar major (right), pear-shaped (right), dentate anterior, gluteus maximus, gluteus medius (right), transverse abdomen, four-headed thigh.

Muscles associated with the airways and lungs by general segmental innervation (physical effects on them can also be called special exercises):

a) belt, occipital, scalene, sternocleidomastoid, intercostal, external and internal, diaphragm, large and small thoracic, dentate anterior and posterior, lifting the scapula, supra- and infraspinatus, trapezoidal, large and small rhomboid, lats, spinal erector , abdominal muscles;

b) associative muscles - iliopsoas, pear-shaped, gluteus maximus, quadriceps thighs, tendon of the broad fascia of the thigh, short, long, large adductor thighs.
Safety! During exercise, the heart rate should be in the so-called "safety zone", which is 50 to 75% of the maximum heart rate. To determine the individual "safety zone", you first need to calculate the maximum number of heartbeats per minute by subtracting the age from 220. Then multiply the resulting number by 50% and 75% to determine the upper and lower boundaries of the "safety zone":
(220 -) × 0.50 upper bound
(220 -) × 0.75 lower bound
These indicators will constitute the "safety zone".
When training with signs of competition, it is easy to overcome the safe threshold for exercise. Feeling signs of inadequacy of physical activity, a person tries to abruptly stop movement, endangering his heart. The results of scientific research on the changes that occur in the body during this kind of training have revealed that the levels of two natural cardiac stimulants - adrenaline and norepinephrine (catecholamines) increase during the most intense part of the exercise, as well as blood pressure. When exercise intensity drops sharply, blood pressure immediately begins to drop and catecholamine levels continue to rise. The body's continued production of natural stimulants may explain cardiac abnormalities (arrhythmias), which in some cases are the cause of death. It is also possible to develop ischemia of the heart due to the lack of blood in the coronary vessels, since blood flow slows down faster than heart contractions.
It takes time to get the body back to its pre-working state - this is the safest way to complete endurance training. You should continue to move, gradually slowing down the pace, for 3-5 minutes. If you feel nausea or a state of unusual strange lightness arises, you need to walk at a slow pace, raising your arms above your head, this contributes to an increase in blood pressure and better blood circulation. You can also lie on your back with your legs raised above head level. Thus, it will be possible to avoid a sharp drop in blood pressure or any other anomalies that could lead to loss of consciousness and even death.
Assessment form: *Testing.*

2. Assessment of the level of endurance development

• Ruffier's test - a one-stage exercise test. It is based on a quantitative assessment of the pulse response to a short-term dynamic load, reflecting the state of the cardiovascular system.
The purpose of the assignment: to learn how to determine your level of development of aerobic performance.
Hardware: stopwatch.
Work progress: After 5 minutes of sitting in a sitting position, the subject calculates heart rate1 in a 15 second period of time. Then he does 24 squats in 30 seconds, after which, within 15 seconds of recovery (in a sitting position), HR2 is again recorded. The third measurement of heart rate3 is made in the same way in a sitting position at the end of the first minute of recovery.
The evaluation of the results of the test is carried out by summing up all three indicators of the pulse: HR1 + HR2 + HR3 (see table).

Pulse sum	Score	Pulse sum	Score	Assessment of results
50	0,0	77	10,8	
51	0,4	78	11,2	

52	0,8	79	11,6	
53	1.2	80	12,0	
54	1,6	81	12,4	
55	2,4	82	12,8	
56	2,4	83	13,2	before 5 Score – fine
57	2.8	84	13,6	
58	3,2	85	14,0	from 5,1-10 – well
59	3,6	86	14,4	
60	4,0	87	14,8	from 10,1-15,0 – satisfactorily
61	4,4	88	15,2	
62	4,8	89	15,6	Over 15,0 - unsatisfactory.
63	5,2	90	16,0	
64	5,6	91	16,4	
65	6,0	92	16,8	
66	6,4	93	17,2	
67	6,8	94	17,6	
68	7,2	95	18,0	
69	7,6	96	18,4	
70	8,0	97	18,8	
71	8,4	98	19,2	
72	8,8	99	19,6	
73	9,2	100	20,0	
74	9,6	101	20,4	
75	10,0	102	20,8	
76	10,4			

3. running / walking during the week – min -10 km

3. Questions for self-control:

1) Endurance is the ability to:
a) a person to perform the exercise with maximum effort;
b) the organism to resist external environmental influences; c) the body quickly recover after exercise; d) the body to resist fatigue;
e) a person quickly adapt to various types of activities.

2) Types of endurance (enter 2 correct answers):
a) purposeful;
b) general;
c) volumetric;
d) special;
e) conditional.

3) Methods for determining endurance (enter 2 correct answers):

a) straight;
b) linear;
c) phased;
d) relative;
e) indirect.

4) Indicate 2 methods for developing endurance:
a) continuous;
b) intensive;
c) uniform;
d) interval.

5) Varieties of special endurance (enter 4 correct answers):
a) high-speed;
b) power;
d) static;
e) basic;
f) speed-power.

Recommended reading:
Grishina, Yu.I. General physical preparation. Know and be able / Yu. I. Grishina. - Rostov-on-Don: Phoenix, 2010 .-- 249 p.

Task 2
The purpose of the assignment is to expand knowledge about your own body and the appearance of motivation to improve it.
Tasks: to identify the most powerful and lagging muscle groups in their development, to think over what needs to be tightened, strengthened, developed in order to achieve harmonious development.
To achieve the goal and solve problems, it is necessary, relying on the following theoretical and methodological materials and recommended literature:
1. Make a set (list) of exercises for the development of strength abilities (perform this set for almost no less than the number of lessons on schedule, observing safety rules).
2. To assess or test strength abilities - (to choose from one of the options below, see the appendix).
3. Answer questions for self-control

TOPIC: STUDENT'S PHYSICAL READINESS
II. POWER. DEVELOPMENT AND CONTROL METHODS
Muscle strength is the maximum effort that a muscle, or muscle group, can produce. Strength is defined as the maximum mass a person can lift once, or 1RM (maximum one repetition). There are concepts: muscle power is the result of strength and speed of movement; muscular endurance - the ability to produce maximum muscular action over a relatively long period of time.
Strength training helps to increase the anaerobic performance (anabolic focus) of the body, which leads to a general health effect. With developed muscles, the level of enzymes that

neutralize free radicals is higher. Under the influence of power loads, hypertrophic processes develop, leading to an increase in working muscle mass. Along with this, the anabolic hormonal system of the whole organism is activated, represented by a certain complex of endocrine glands (pituitary gland, thyroid gland, adrenal cortex, sex glands, etc.). This type of exercise has a positive effect not only on the growth of muscle tissue, but also bone and tissue of other organs and systems of the body. In children, this contributes to the acceleration of biological, puberty and an increase in the rate of physical development, and in adults, regenerative, restorative processes intensify and age-related involutional processes slow down.

The form. Anaerobic type of load, i.e. short-term intense physical activity. Stimulation of the anabolic hormonal system is possible when performing physical exercises, where large muscles are involved - at least 1/2 - 2/3 of the total muscle mass of the body, then the effect of exercises will go beyond the local hypertrophic and become general anabolic. In strength training, static (isometric) and dynamic modes of muscle work are used. The dynamic mode includes the use of various weights (weights or own body weight), variable resistance trainers, isokinetic modes of movements (pneumatic, hydraulic trainers) and plyometric exercises.

Content. The main method for the development of absolute strength is the method of maximum efforts, which consists in performing exercises with weights within 1 - 3-RM in one lesson, 3-5 approaches, the rest intervals between them are 2-5 minutes. If the goal of the training is to increase the size of the muscles (hypertrophy), the method of repeated efforts should be applied, the load value is set within 8-12-PM, the number of repetitions is 3-6 (minimum) to 10-15 (maximum), the duration of rest pauses should not exceed 90 sec.

Tab. Classification of weights (Ch.T. Ivankov, 2005)

Weights (resistance, weight)	The number of possible repetitions in one set	Heart rate intensity beats / min
Limiting	1	190-200
Near limit	2-3	180-190
Large	4-7	170-180
Moderately large	8-12	160-170
The average	13-18	150-160
Small	19-25	140-150
Very small	Over 25	130-140

Methodological features.

1) The main methodological principles when performing exercises for the development of strength are: gradual increase in the weight of the used weights, the continuity of training sessions, an individual approach to training exercises. 2) Frequency of strength training for health purposes 3 times a week.

3) A warm-up is required before strength training, the most effective is the aerobic form.

4) The most typical means of training is monotonous rhythmic movements that include global and local muscle groups.

5) Knowing the basics of strength training exercise technique is the key to safe, effective, and lasting results in your motor performance.

6) It is not recommended to alternate exercises for different muscle groups; one should completely "work out" one muscle group, and then move on to another. In one lesson, it is not

possible to perform a similar program for all muscle groups. Therefore, it is recommended to isolate 1-2 muscle groups and act on them for 4-8 weeks. Then there is a change in the complexes of training exercises.

7) With local and regional exercises, synergist muscles are actively affected and antagonist muscles are not used. It also maintains the muscle balance required for the symmetrical development of strength on both sides of the body.

8) Movements must be synchronized with breathing: exhalation - during the effort phase and inhalation - during the relaxation phase.

9) Rest between sets. Large muscle groups need more time to rest than body parts with less muscle mass. When working out the legs, it is better to use a form of active recreation, in the form of walking. Use stretching exercises for working muscles as a remedy after strength training.

10) Contraindications to strength training are taken into account (high myopia, arterial hypertension, ptosis, disc herniation, etc.).

11) When exercising in order to increase muscle mass, appropriate nutrition is required: with a lack of protein in food, muscle mass and muscle strength do not grow. Be sure to drink water during training. Drink before you feel the need; never let your body get thirsty.

Strength training safety.

• Joints. Do not "turn off" joints when doing exercises. Overextension moves nearly all of the load from the muscles to the joint without any benefit to the development of the muscle being worked on. In addition, this position of the loaded joint can injure it.

• Ligaments and tendons. Avoid excessive stretching (overstretching) of ligaments and tendons near the joints. Repeated excessive stretching of the connective tissue in the joints can lead to joint weakness (in medicine, this is called a dangling joint).

• Spine. Always maintain a neutral spine position. Never bend forward (unless this is a technical element of the exercise) and do not bend in the lumbar region. Sometimes these positions of the spine give the impression that the exercise is easier, but in reality you are putting the spine at significant risk of injury. Keep the abdominal and buttock muscles tense and taut. This will help stabilize the spine and protect the lower part from injury.

• Head. Never raise your head up too high, tilt it back, or move it forward and downward. Any of these positions during strength training jeopardize the fragile cervical vertebrae and put them at risk of injury.

• Standing positions. In a standing position, spread your legs wide enough so that you feel stability and maintain balance.

• Positions: sitting and lying. When performing exercises while sitting, keep the foot firmly pressed to the floor, and the legs bent at the knees should make a right angle. In the supine position, bend your knees so that your feet are shoulder-width apart, firmly pressed to the floor, and press your lower back to the support. This will help stabilize the lower spine.

• Breathing. If you hold your breath during effort (lifting weight), intrathoracic pressure and pressure in the muscles around the chest can increase so that a sharp reduction in the required amount of blood is possible, which must necessarily return to the heart muscle. Otherwise, it can lead to dizziness, short-term loss of consciousness, or even a bursting blood vessel.

• Work with weights. Keep weights close to the body during any exercise to avoid building up momentum. Control the speed of the projectile, do not jerk the weight. Lift weights not by tilting

and then extending the back muscles, but first do a squat or lunge, take the object in your hands closer to the body and straighten your legs to raise it.
Application

EVALUATE OR TEST YOUR POWER PERFORMANCE
First option Assessment of strength abilities:

Directional characteristic of the test / gender		*Score in points*				
		5	4	3	2	1
Abdominal strength						
lifting the shoulder girdle from a supine position, hands behind the head, legs bent at the knees, the number of times	Ж	57 and higher	50 - 56	44 - 49	37 - 43	36 and below
	M	61 and higher	51 - 60	43 - 50	36 - 42	35 and below
raising the legs up and lowering from a supine position, arms to the sides, the number of times	Ж	36 and higher	31 - 35	28 - 30	24 - 27	23 and below
	M	37 and higher	33 - 36	29 - 32	25 - 28	24 and below
or						
flexion and extension of the knees, pulling the heels to the buttocks from a supine position, arms to the sides, the number of times	Ж	43 and higher	38 - 42	33 - 37	28 - 32	27 and below
	M	45 and higher	41 - 44	36 - 40	30 - 35	29 and below
Strength of the back muscles						
raising the upper body from a prone position, arms forward, the number of times	Ж	52 and higher	45 - 51	39 - 44	32 - 38	31 and below
	M	50 and higher	45 - 49	38 - 44	31 - 37	30 and below
Strength of the muscles of the shoulder girdle						
flexion and extension of the arms from the support while kneeling, the number of times	Ж	36 and higher	28 - 35	23 - 27	19 - 22	18 and below
flexion and extension of the arms from the lying position, the number of times	M	43 and higher	35 - 42	30 - 34	25 - 29	24 and below

Raising the trunk from a prone position is performed from the starting position:
lying on your back, arms behind your head, elbows forward, legs bent at the knees at right angles, feet pressed by the partner to the floor. The maximum number of lifts is performed, touching the hips with the elbows, followed by a return to the starting position. The number of correct trunk lifts is counted. To perform the test, pairs are created, one of the partners performs the exercise, the other holds his legs by the feet and legs and at the same time counts. Then the participants change places.
Errors:
1) no elbows touching the hips (knees);
2) no touching the mat with the shoulder blades;

3) fingers are open "out of the lock";
4) displacement of the pelvis.
Flexion and extension of the arms in the support lying on the floor is performed from the starting position: the support is lying on the floor, arms shoulder-width apart, hands forward, elbows are not more than 45 degrees apart, shoulders, trunk and legs form a straight line. The feet rest on the floor. Bending your arms, you need to touch the floor with your chest (or a platform 5 cm high), then, unbending your arms, return to the starting position and, fixing it for 0.5 seconds, continue the exercise. The number of correct flexions and extensions of the arms is counted.
Errors:
1) touching the floor with knees, hips, pelvis;
2) violation of a straight line (shoulders - trunk - legs); 3) no fixation for 0.5 seconds of the initial position; 4) extension of arms at different times.

Second option. Power conditioning testing:

Normative test	*Level*		
	Threshold	*Advanced*	*Excellent*
(FEM.) Pull-up from a hang lying on a low bar (at a height of 90 cm), the number of times	8	12	18
(FEM. Special group) Pulling up from a hang lying on a low bar (at a height of 90 cm), the number of times	7	10	15
(Man) Hanging high bar chin the number of times	5	12	15
or weight snatch 16 kg, the number of times	15	25	43
(MEN. Special group) Pulling up from a hang on a high bar, the number of times	1	5	10

A pull-up from a hang while lying on a low bar is performed from the starting position: hanging lying face up with an overhead grip, hands shoulder-width apart, head, torso and legs are in a straight line, heels can rest on a support up to 4 cm high. In order to take the starting position, you need to go to the bar, grab the bar with a grip from above, sit down under the bar and, keeping your head straight, put your chin on the bar of the bar. Then, without straightening your arms and without lifting your chin from the bar, stepping forward, straighten so that your head, body and legs are in a straight line. After that, straighten your arms and take the starting position. From the starting position, pull yourself up until the chin crosses the bar, then return to the starting position and fix for 0.5 seconds.
The number of correctly performed pull-ups is counted.
Errors:
1) pull-ups with jerks or bending of the trunk;

2) the chin has not risen above the bar neck;
3) no fixation for 0.5 seconds of the initial position;
4) simultaneous flexion of the arms.

A pull-up from a hang on a high bar is performed from the starting position: hang with a grip from above, hands shoulder-width apart, arms, torso and legs are straightened, legs do not touch the floor, feet together. You need to pull up so that the chin crosses the top line of the bar's bar, then lower to the hang and continue the exercise. The number of correctly performed pull-ups is counted.

Errors:

1) pulling up in jerks or with swings of the legs (trunk); 2) the chin has not risen above the bar neck;
3) bending the arms at different times.

QUESTIONS FOR SELF-CONTROL

1) Strength is a person's ability to overcome external resistance:

a) with maximum speed;
b) with minimal effort;
c) for a long time;
d) due to volitional efforts;
e) due to maximum muscular effort.

2) Strength training modes (enter 2 correct answers):

a) dynamic;
b) certain;
c) classic;
d) static;
e) metric.

3) Types of dynamic force-directed contractions (indicate 4 correct answers):

a) free weights;
b) explosive;
c) variable resistance;
d) high-speed;
e) isokinetic;
f) plyometrics;
g) slow.

4) Indicate 2 incorrect methods of strength development:

a) maximum effort;
b) outrageous efforts;
c) repeated efforts;
d) dynamic efforts;
e) isometric efforts;
f) minimal effort;
g) electrical stimulation.

5) Relative strength is the magnitude of the force:
a) relative to the athlete's absolute effort;
b) per 1 centimeter of the athlete's body;
c) regarding the record of the given athlete;
d) per 1 kilogram of the athlete's weight;
e) per 1 kilogram of the lifted weight.

Recommended reading:
1) Grishina, Yu. I. Fundamentals of strength training: Know and be able / Yu. I. Grishina. - SPb .: SPb GTI (TU), 2007 .-- 312 p.
2) Frederic Delavier. Anatomy of strength exercises for men and women https: // cloud. mail.ru/stock/9t GnX2C7oQZZypr X9LdkjeJs

GENERAL PHARMACEUTICAL CHEMISTRY

Teachers: Gordeeva Daria
Building, Department, classroom Institute of Pharmacy, Fatykh Amirkhan street, 16, 421 room
Contact details:
Telephone number: +7 (843) 521-16-42 (Ganieva Guzel)
E-mail address: institute.pharmacy@kazangmu.ru
Office and working hours: 201 (9-17)

Total hours: 432 h
-Lectures: 64 h
-Practical classes: 180 h
-Independent work: 152 h
-Control: 36 h

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=1962).

Course work – an assignment that is completed by students in the form of essays or research work.

Course objectives: The purpose of mastering the discipline

The goals of mastering the general pharmaceutical chemistry discipline are development of students' personal qualities, formation of general professional and professional competencies in accordance with the requirements of the Federal State Educational Standard of Higher Education. To reveal the methodology of obtaining, quality control, standardization and safety of medicines based on the general laws of basic sciences and in accordance with the applied nature of pharmaceutical chemistry in order to fulfill professional tasks of pharmaceutical chemistry.

Tasks of the discipline:

• Acquire knowledge of the theoretical foundations of modern pharmacological analysis.

• Study drug analysis according to regulatory documents and evaluate their quality based on the obtained results. Ability to prepare reagents, standard solutions, titrated solutions and analyzed solutions.

• Acquire the ability to solve a situational professional problem.

• Develop practical skills in conducting drug quality control.

• Develop practical skills in determining general drug quality indicators: solubility, melting point, density, acidity and alkalinity, transparency, color, ash, loss in weight on drying, etc.

• Develop practical skills in interpreting the results of UV and IR spectrometry to confirm the identity of drugs; use various types of chromatography in drug analysis and interpret the results.

• Develop practical skills in establishing the quantitative content of medicinal substances in the pharmaceutical substance and in dosage form using titrimetric and physicochemical methods.

• Develop practical skills in testing the purity of medicinal products and establishing the limits of impurity content using chemical and physicochemical methods.

• Develop the ability to conduct independent analytical, research work and perform individual research and applied scientific tasks in developing new methods and technologies in the field of pharmacy.

Course topics:

Calendar plan of lectures

III semester

1. Topic 1.1. Subject and main content of pharmaceutical chemistry (PC). Terminology in PC. Quality control of pharmaceutical substances. Regulations. Contents: special terms of pharmaceutical chemistry, the relationship between the structure of a substance and the effect on the body, the dependence of the pharmacological action of drugs on pharmacokinetic properties, methods of pharmaceutical analysis of drugs, general information on testing drugs for toxicity, sterility and microbiological purity.
2. Topic 1.2. Unification of methods for quality control of pharmaceutical substances. Description, solubility, general reactions to the authenticity, transparency and turbidity of liquids, the degree of color of liquids (chromaticity). Content: basic provisions and documents regulating pharmaceutical products, quality criteria for drugs, documents regulating pharmaceutical products, the structure of a monograph for a pharmaceutical substance. GPM. Rules for the use of pharmacopoeial monographs, solubility,

transparency and turbidity of liquids, color. Stability of medicines. The processes occurring during the storage of drugs.

3. Topic 1.3. Unification of methods for quality control of pharmaceutical substances. Loss on drying, determination of water, density, melting point, total and sulphated ash. Contents: the importance of physical constants in pharmacopoeial analysis.
4. Topic 1.5. Unification of methods for quality control of pharmaceutical substances. Tests for purity and impurity limits. Contents: the reasons for the poor quality of pharmaceutical substances. Classification of impurities. Preparation of standard solutions. Methods for establishing limits for the content of common technological impurities (reference and standard-free methods). Arsenic test. Methods for the quantitative determination of pharmaceutical substances.
5. Topic 2.1. Pharmaceutical substances of elements of groups IV, V and VI of the periodic system D.I. Mendeleev. Contents: classification of inorganic drugs. Methods of obtaining. Purposeful search for new drugs. Research methods of inorganic medicinal products. Purified water, water for injection, hydrogen peroxide solution, magnesium peroxide, hydroperite; sodium thiosulfate, sodium bicarbonate, sodium nitrite. Authenticity, quality indicators, application, storage.

IV semester

1. Topic 2.2. Pharmaceutical substances of elements of the VII group of the periodic system. Content: iodine, its alcohol solutions, potassium and sodium chlorides, bromides, iodides, sodium fluoride, hydrochloric acid. Authenticity, quality indicators, application, storage
2. Topic 2.3. Pharmaceutical substances of elements of groups II and III of the periodic system. Contents: barium sulfate for fluoroscopy, calcium chloride, calcium sulfate, magnesium oxide, magnesium sulfate; zinc oxide, zinc sulfate; aluminum hydroxide, boric acid, sodium tetraborate, basic bismuth nitrate. Authenticity, quality indicators, methods of analysis, application, storage
3. Topic 2.4. Pharmaceutical substances of silver, copper, iron salts. Content: silver nitrate, collargol (colloidal silver), protargol (silver proteinate), copper sulfate, iron (II) sulfate. Authenticity, quality indicators, methods of analysis, application, storage
4. Functional analysis of organic medicinal substances. Contents: classification of functional groups, alcoholic hydroxyl, phenolic hydroxyl, aldehyde group, ketone group, α-ketol group.
5. Functional analysis of organic medicinal substances. Content: carboxyl group, ester group, lactone group, nitrogen-containing groups and others.
6. Topic 3.1. Halogenated derivatives of acyclic alkanes. Alcohols and Ethers. Contents: chloroethyl, halothane (fluorothane), ethanol (ethyl alcohol), glycerol (glycerin), nitroglycerin, medical ether (diethyl ether). Authenticity, quality indicators, application, storage. Oxygen flask combustion method. Acetylation method.
7. Topic 3.2. Aldehydes and carbohydrates. Contents: formaldehyde solution, chloral hydrate, methenamine (hexamethylenetetramine), dextrose (glucose). Authenticity, quality indicators, application, storage. Refractometry. Iodometry.
8. Topic 3.3. Carboxylic acids and their derivatives. Contents: potassium acetate, calcium lactate, calcium gluconate, sodium citrate, sodium valproate. Authenticity, quality

indicators, application, storage. Ion exchange chromatography. Acid-base titration in non-aqueous media.

V semester

1. Topic 3.5. Amino acids and their derivatives. Derivatives of dithiocarbamic acid. Contents: glutamic acid, aminocaproic acid, γ-aminobutyric acid (GABA, aminalon); cysteine, acetylcysteine, penicillamine, methionine, disulfiram (teturam). Authenticity, quality indicators, application, storage.
2. Topic 3.6. Terpenes. Diterpenes. Contents: menthol, validol, terpinhydrate, camphor, bromcamphor, sulfocamphoric acid, sulfocamphocaine, retinol and its derivatives (vitamins of group A). Authenticity, quality indicators, application, storage.
3. Topic 3.7. Derivatives of cyclopentaneperhydrofenanthrene. Androgens. Anabolic steroid. Contents: ergocalciferol, cholecalciferol (vitamins of group D), testosterone propionate, methyltestosterone, methandienone (methandrostenolone), methandriol (methyandrostenediol), nandrolone phenylpropionate (phenobolin), nandrolone decanoate (retabolil). Authenticity, quality indicators, application, storage.
4. Topic 3.8. Corticosteroids. Gestagens and their synthetic analogues. Contents: deoxycortone acetate (deoxycorticosterone acetate), cortisone acetate, prednisolone, hydrocortisone, dexamethasone, progesterone, norethisterone (norkolut), medroxyprogesterone acetate (depo-provera).
5. Topic 3.9. Estrogens. Contents: estrone, estradiol, ethinylestradiol, estradiol dipropionate. Synthetic analogs of estrogens: sinestrol, diethylstilbestrol. Authenticity, quality indicators, application, storage.
6. Topic 4.1. Betalactamides. Contents: penicillins. General characteristics and structure. The relationship between structure and biological action. Penicillins of natural origin: benzylpenicillin and preparations based on it: its sodium, potassium and novocaine salts, benzathine benzylpenicillin, phenoxymethylpenicillin. Semisynthetic penicillins: oxacillin sodium salt, ampicillin, carbenicillin disodium salt, amoxicillin. Authenticity, quality indicators, application, storage.
7. Topic 4.2. Tetracyclines. Contents: tetracycline, oxytetracycline, metacyclin, doxycycline. Authenticity, quality indicators, application, storage.
8. Topic 5.1. Phenols and their derivatives. Contents: phenol, thymol, resorcinol. Derivatives of naphthoquinones (vitamin K). The synthetic analogue of vitamin K is sodium menadione bisulfite (vicasol). Derivatives of n-aminophenol: paracetamol. Derivatives of m-aminophenol: neostigmine (proserin). Phenylacetic acid derivatives: diclofenac (ortofen). Authenticity, quality indicators, application, storage.
9. Topic 5.2. Aromatic acids and their salts. Derivatives of salicylic acid. Contents: benzoic acid, sodium benzoate, salicylic acid, sodium salicylate, acetylsalicylic acid, osalmide (oxafenamide), aminosalicylic acid (sodium p-aminosalicylate). Authenticity, quality indicators, application, storage.

VI semester

1. Topic 5.3. Pharmacopoeial analysis of p-aminobenzoic acid derivatives: benzocaine (anesthesin), procaine (novocaine), tetracaine (dicaine). Authenticity, quality indicators, methods of analysis, application, storage.

2. Topic 5.4. Pharmacopoeial analysis of p-aminobenzoic acid amide derivatives: procainamide (novocainamide), metoclopramide; Authenticity, quality indicators, methods of analysis, application, storage.
3. Topic 5.5. Pharmacopoeial analysis of diethylaminoacetanilide derivatives: trimecaine, lidocaine (xycaine) and structurally similar local anesthetics: bupivacaine, articaine (ultracaine). Authenticity, quality indicators, methods of analysis, application, storage.
4. Topic 5.6. Iodized derivatives of amino acids: liothyronine (triiodothyronine), levothyroxine (thyroxine), amidotrizoic acid (triombrin). Authenticity, quality indicators, methods of analysis, application, storage.
5. Topic 5.7. Pharmacopoeial analysis of derivatives of arylalkylamines, hydroxyphenylalkylamines: ephedrine, dopamine (dopamine), epinephrine (adrenaline), norepinephrine (norepinephrine), isoprenaline (isadrin), fenoterol (berotec), salbutamol (ventolin), vera-pamil (isoptin). Authenticity, quality indicators, methods of analysis, application, storage.
6. Topic 5.8. Pharmacopoeial analysis of hydroxypropanolamine derivatives: propranolol (anaprilin), atenolol (tenormin), timolol, fluoxetine (Prozac) and hydroxyphenylaliphatic amino acid derivatives: levodopa, methyldopa (methyldopa). Authenticity, quality indicators, methods of analysis, application, storage.
7. Topic 5.9. Pharmacopoeial analysis of nitrophenylalkylamine derivatives: chloramphenicol (levomycetin) and its esters (stearate and succinate) and aminodibromophenylalkylamine derivatives: bromhexine, ambroxol. Authenticity, quality indicators, methods of analysis, application, storage.
8. Topic 5.10. Pharmacopoeial analysis of sulfonamides, derivatives of the aliphatic and heterocyclic series: sulfanilamide (streptocide), sodium sulfacetamide (sulfacyl sodium), sulfadimethoxine, sulfalene, the combined drug co-trimoxazole (bactrim) and sulfonamides substituted at the amide and aromatic amino groups: phthalylsulfathiazole (phthalazol), salazodine (salazopyridazine). Authenticity, quality indicators, methods of analysis, application, storage.
9. Topic 5.11. Pharmacopoeial analysis of sulfonylurea derivatives: carbutamide (bucarban), glibenclamide (maninil), glipizide (minidiab), gliclazide (predian). Derivatives of benzenesulfochloramide: chloramine B, halazon (pantocid). Authenticity, quality indicators, methods of analysis, application, storage.

Calendar plan of laboratory classes

III semester

1. Topic 1.1. Subject and main content of pharmaceutical chemistry (PC). Terminology in PC. Quality control of pharmaceutical substances. Regulations. Contents: tasks of pharmaceuticals and their place in the complex of pharmaceutical sciences, connection with basic and medical disciplines. Terminology in PC. Sources of obtaining pharmaceutical substances. Quality requirements. Normative documents. The structure of the Pharmacopoeia Monograph. Safety precautions when working in a chemical laboratory.
2. Topic 1.2. Unification of methods for quality control of pharmaceutical substances. Description, solubility, general reactions to the authenticity, transparency and turbidity of liquids, the degree of color of liquids (chromaticity). Contents: General Pharmacopoeia

Monograph. Rules for the use of pharmacopoeial monographs. Description of pharmaceutical substances, solubility, general reactions to authenticity.

3. Continuation of the topic. Content: transparency and turbidity of liquids, color.
4. Control 1
5. Topic 1.3. Unification of methods for quality control of pharmaceutical substances. Loss on drying, determination of water, density, melting point, total and sulphated ash. Content: determination of water (method of drying, distillation, titration with Fischer's reagent, coulometry) and density (using a hydrometer and pycnometer) in pharmacopoeial analysis.
6. Continuation of the topic. Contents: determination of the melting point (State pharmacopoeia methods, glass device and PTP device) and ash (sulfate, total) in pharmacopoeial analysis.
7. Topic 1.4. Unification of methods for quality control of pharmaceutical substances. pH, acidity, alkalinity. Content: the value of physical constants in pharmacopoeial analysis (pH value of a solution, determination of acidity, alkalinity).
8. Topic 1.5. Unification of methods for quality control of pharmaceutical substances. Tests for purity and impurity limits. Contents: sources and reasons for the poor quality of pharmaceutical substances. Classification of impurities. Preparation of standard solutions.
9. Continuation of the topic. Content: methods for setting limits for the content of common technological impurities (reference and non-reference methods). Arsenic test.
10. Control 2.
11. Practical skills.
12. Final test.

IV semester

1. Topic 2.1. Pharmaceutical substances of elements of IV, V and VI groups of the periodic system. Contents: pharmaceutical substances of inorganic nature, classification, production methods, research methods. Purified water, water for injection, hydrogen peroxide solution, magnesium peroxide, hydroperite; sodium thiosulfate, sodium bicarbonate, sodium nitrite. Authenticity, quality indicators, application, storage
2. Topic 2.2. Pharmaceutical substances of elements of the VII group of the periodic system. Content: iodine, its alcohol solutions, potassium and sodium chlorides, bromides, iodides, sodium fluoride, hydrochloric acid. Authenticity, quality indicators, application, storage
3. Control 3.
4. Topic 2.3. Pharmaceutical substances of elements of groups II and III of the periodic system. Content: barium sulfate for fluoroscopy, calcium chloride, calcium sulfate, magnesium oxide, magnesium sulfate. Authenticity, quality indicators, application, storage
5. Continuation of the topic. Content: zinc oxide, zinc sulfate; aluminum hydroxide, boric acid, sodium tetraborate, basic bismuth nitrate. Authenticity, quality indicators, application, storage
6. Topic 2.4. Pharmaceutical substances of silver, copper, iron salts. Content: silver nitrate, collargol (colloidal silver), protargol (silver proteinate), copper sulfate, iron (II) sulfate. Authenticity, quality indicators, application, storage

7. Control 4.
8. Topic 3.1. Halogenated derivatives of acyclic alkanes. Alcohols and Ethers. Contents: chloroethyl, halothane (fluorothane), ethanol (ethyl alcohol), glycerol (glycerin), nitroglycerin, medical ether (diethyl ether). Authenticity, quality indicators, application, storage. Oxygen flask combustion method. Acetylation method.
9. Topic 3.2. Aldehydes and carbohydrates. Contents: formaldehyde solution, chloral hydrate, methenamine (hexamethylenetetramine), dextrose (glucose). Authenticity, quality indicators, application, storage. Refractometry. Iodometry.
10. Topic 3.3. Carboxylic acids and their derivatives. Contents: potassium acetate, calcium lactate, calcium gluconate, sodium citrate, sodium valproate. Authenticity, quality indicators, application, storage. Ion exchange chromatography. Acid-base titration in non-aqueous media.
11. Control 5.
12. Final test.

V semester

1. Topic 3.4. Lactones of unsaturated polyhydroxy acids. Content: ascorbic acid. Authenticity, isomerism, quality indicators, application, storage.
2. Topic 3.5. Amino acids and their derivatives. Derivatives of dithiocarbamic acid. Contents: glutamic acid, aminocaproic acid, γ-aminobutyric acid (GABA, aminalon); cysteine, acetylcysteine, penicillamine, methionine, disulfiram (teturam). Authenticity, quality indicators, application, storage. Kjeldahl method.
3. Topic 3.6. Terpenes. Diterpenes. Contents: menthol, validol, terpinhydrate, camphor, bromcamphor, sulfocamphoric acid, sulfocamphocaine, retinol and its derivatives (vitamins of group A). Authenticity, quality indicators, application, storage. Polarimetry.
4. Topic 3.7. Derivatives of cyclopentaneperhydrofenanthrene. Androgens. Anabolic steroid. Contents: ergocalciferol, cholecalciferol (vitamins of group D), testosterone propionate, methyltestosterone, methandienone (methandrostenolone), methandriol (methyandrostenediol), nandrolone phenylpropionate (phenobolin), nandrolone decanoate (retabolil). Photoelectric colorimetry. Spectrophotometry.
5. Topic 3.8. Corticosteroids. Gestagens and their synthetic analogues. Contents: deoxycortone acetate (deoxycorticosterone acetate), cortisone acetate, prednisolone, hydrocortisone, dexamethasone, progesterone, norethisterone (norkolut), medroxyprogesterone acetate (depo-provera).
6. Topic 3.9. Estrogens. Contents: estrone, estradiol, ethinylestradiol, estradiol dipropionate. Synthetic analogs of estrogens: sinestrol, diethylstilbestrol. Authenticity, quality indicators, application, storage. 4
7. Control 1.
8. Topic 4.1. Betalactamides. Contents: chemical classification of antibiotics, classification by action. Quality requirements. Unit of activity, biological, chemical and physicochemical methods of quality assessment. Penicillins. General characteristics and structure. The relationship between structure and biological action. Penicillins of natural origin: benzylpenicillin and preparations based on it: its sodium, potassium and novocaine salts, benzathine-benzylpenicillin, phenoxymethylpenicillin. Semisynthetic

penicillins: oxacillin sodium salt, ampicillin, carbenicillin disodium salt, amoxicillin. Cephalexin, cephalothin. Authenticity, quality indicators, application, storage

9. Topic 4.2. Tetracyclines. Contents: tetracycline, oxytetracycline, metacyclin, doxycycline. Authenticity, quality indicators, application, storage
10. Topic 5.1. Phenols and their derivatives. Contents: phenol, thymol, resorcinol. Derivatives of naphthoquinones (vitamin K). The synthetic analogue of vitamin K is sodium menadione bisulfite (vicasol). Derivatives of n-aminophenol: paracetamol. Derivatives of m-aminophenol: neostigmine (proserin). Phenylacetic acid derivatives: diclofenac (ortofen). Authenticity, quality indicators, application, storage. Cerimetry.
11. Topic 5.2. Aromatic acids and their salts. Derivatives of salicylic acid. Contents: benzoic acid, sodium benzoate, salicylic acid, sodium salicylate, acetylsalicylic acid, osalmide (oxafenamide), aminosalicylic acid (sodium p-aminosalicylate). Authenticity, quality indicators, application, storage. Nitritometry.
12. Control 2.
13. Practical skills.
14. Final test.

VI semester

1. Topic 5.3. Pharmacopoeial analysis of p-aminobenzoic acid derivatives: benzocaine (anesthesin), procaine (novocaine), tetracaine (dicaine). Authenticity, quality indicators, methods of analysis, application, storage.
2. Topic 5.4. Pharmacopoeial analysis of p-aminobenzoic acid amide derivatives: procainamide (novocainamide), metoclopramide; Authenticity, quality indicators, methods of analysis, application, storage.
3. Topic 5.5. Pharmacopoeial analysis of diethylaminoacetanilide derivatives: trimecaine, lidocaine (xycaine) and structurally similar local anesthetics: bupivacaine, articaine (ultracaine). Authenticity, quality indicators, methods of analysis, application, storage.
4. Topic 5.6. Iodized derivatives of amino acids: liothyronine (triiodothyronine), levothyroxine (thyroxine), amidotrizoic acid (triombrin). Authenticity, quality indicators, methods of analysis, application, storage.
5. Topic 5.7. Pharmacopoeial analysis of derivatives of arylalkylamines, hydroxyphenylalkylamines: ephedrine, dopamine (dopamine), epinephrine (adrenaline), norepinephrine (norepinephrine), isoprenaline (isadrin), fenoterol (berotec), salbutamol (ventolin), vera-pamil (isoptin). Authenticity, quality indicators, methods of analysis, application, storage.
6. Control 3.
7. Topic 5.8. Pharmacopoeial analysis of hydroxypropanolamine derivatives: propranolol (anaprilin), atenolol (tenormin), timolol, fluoxetine (Prozac) and hydroxyphenylaliphatic amino acid derivatives: levodopa, methyldopa (methyldopa). Authenticity, quality indicators, methods of analysis, application, storage.
8. Topic 5.9. Pharmacopoeial analysis of nitrophenylalkylamine derivatives: chloramphenicol (levomycetin) and its esters (stearate and succinate) and aminodibromophenylalkylamine derivatives: bromhexine, ambroxol. Authenticity, quality indicators, methods of analysis, application, storage.

9. Topic 5.10. Pharmacopoeial analysis of sulfonamides, derivatives of the aliphatic and heterocyclic series: sulfanilamide (streptocide), sodium sulfacetamide (sulfacyl sodium), sulfadimethoxine, sulfalene, the combined drug co-trimoxazole (bactrim) and sulfonamides substituted at the amide and aromatic amino groups: phthalylsulfathiazole (phthalazol), salazodine (salazopyridazine). Authenticity, quality indicators, methods of analysis, application, storage.
10. Topic 5.11. Pharmacopoeial analysis of sulfonylurea derivatives: carbutamide (bucarban), glibenclamide (maninil), glipizide (minidiab), gliclazide (predian). Derivatives of benzenesulfochloramide: chloramine B, halazon (pantocid). Authenticity, quality indicators, methods of analysis, application, storage.
11. Control 4.
12. Final test.

Text books and required supplies:

1. Pharmaceutical Chemistry [Electronic resource]: a textbook / edited by A.P. Arzamastsev. - 2nd ed., corrected. - M.: GEOTAR-Media, 2008. http://www.studentlibrary.ru/book/ISBN9785970407448.html.
2. Belikov V. G. Pharmaceutical Chemistry [Text]: a textbook for students, training in the specialty 060108 (040500) - pharmacy / V. G. Belikov. - 2nd ed. - M.: MEDpress-inform, 2008. - 615, [1] p.
3. Vergeychik E.N. Pharmaceutical Chemistry [Text]: textbook / E. N. Vergeychik. - Moscow: MEDpress-inform, 2016. - 442, [2] p.
4. Chupak-Belousov V.V. Pharmaceutical Chemistry [Text]: lecture course: textbook: in 2 books / V.V. Chupak-Belousov. - Moscow: Binom. - Book 1, 2 3 course. -2014. - 335 p., 337 p.
5. Krasnov E.A. Pharmaceutical Chemistry in Questions and Answers [Electronic resource] / E.A. Krasnov, R.A. Omarova, A.K. Boshkaeva. – M.: Litterra, 2016. http://www.studentlibrary.ru/book/ISBN9785423501495.html

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – “poor”, 70-79 – “satisfactory”, 80-89 – “good”, 90-100 – “excellent”.

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during breaks
- Using phone is allowed only during breaks

Example of control No. 1

1. Give authenticity reactions to the Potassium bromide preparation, arrange the coefficients, explain the reaction conditions.
2. What is a Pharmacopoeia? What type of articles does it consist of? Please give examples. The structure of articles on drugs. Unification of requirements for the analysis of drugs (general Pharmacopoeia articles).
3. Determination of drug purity: characterization of the appearance and solubility of drugs. Possible changes due to improper storage.

Example of control No. 2

1. Arrange in the correct sequence for determining the melting point of substances
   1) grinding of substences
   2) movement of substance (We use awatch glass and a long glass tube in order to move the sample of the substance from the open end to the sealed one)
   3) Capillary inside the tube, the substance has moved from the open end to the sealed
   4) the device heats up to 35 degrees, then a capillary with a substance is inserted, heats up slowly at a speed of 2 degrees per minute. The time from the beginning of the melting of the first particles to the complete melting of the substance is recorded.
   5) fill the capillary by 0.5-0.8 cm
   6) Throw the capillary into the tube with the sealed end down, the open end from above - the substance falls from the open end into the sealed end of the capillary
2. Please calculate the alcohol concentration (by using tables) if the density of the alcohol solution is known p=0,9550

density concentration

pharmacopoeia.ru/prilozheniya-k-gf-xiii-13-izd/

2	52	54	74	56	0	28,06	34,03	86	59
0	66	71	87	75	0,9568	19	17	97	75
0,9648	81	88	22,00	93	6	31	31	27,08	90
6	95	28,05	14	29,12	4	43	45	19	36,06
4	23,09	22	27	29	2	56	60	31	22
2	23	38	40	47	0	68	74	42	37
0	38	55	53	65	0,9558	80	88	53	53
0,9638	52	72	67	83	6	93	35,02	64	68
6	66	88	79	30,00	4	29,05	16	75	84
4	80	29,05	93	18	2	17	30	86	99
2	94	21	23,05	36	0	29	44	97	37,15
0	24,08	38	19	54	0,9548	41	58	28,07	30
0,9628	22	54	32	71	6	53	72	19	46
6	36	71	45	90	4	65	85	30	51
4	50	87	58	31,07	2	77	99	41	76
2	64	30,03	70	24	0	89	36,13	52	92
0	78	19	83	42	0,9538	30,01	26	62	38,06
0,9618	92	35	95	60	6	13	40	73	21
6	25,05	52	24,09	78	4	25	53	83	36
4	19	68	21	95	2	36	67	94	51
2	32	84	34	32,12	0	48	80	29,05	66

3. Please describe the method for determining the impurity of sulfates in the pharmaceutical substance Sodium chloride. Which reagent you use, write rection.
   Sulphates. Not more than 0.02% (from Sodium chloride monograph)

Example of control No. 3

Calcium chloride. Silver nitrate. Present the characterization of pharmaceutical substances in accordance with the algorithm

Algorithm for pharmaceutical substance characterization:

1. Latin name, chemical formula
2. Description, solubility
3. Qualitative analysis. Identification
4. Methods of quantitative determination, their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer
5. Storage conditions due to physical and chemical properties and the influence of the external environment
6. Medical use, dosage forms

Example of control No. 4

Magnesium oxide. Iron sulfate. Present the characterization of pharmaceutical substances in accordance with the algorithm

Algorithm for pharmaceutical substance characterization:

1. Latin name, chemical formula
2. Description, solubility
3. Qualitative analysis. Identification
4. Methods of quantitative determination, their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer
5. Storage conditions due to physical and chemical properties and the influence of the external environment
6. Medical use, dosage forms

Example of control No. 5

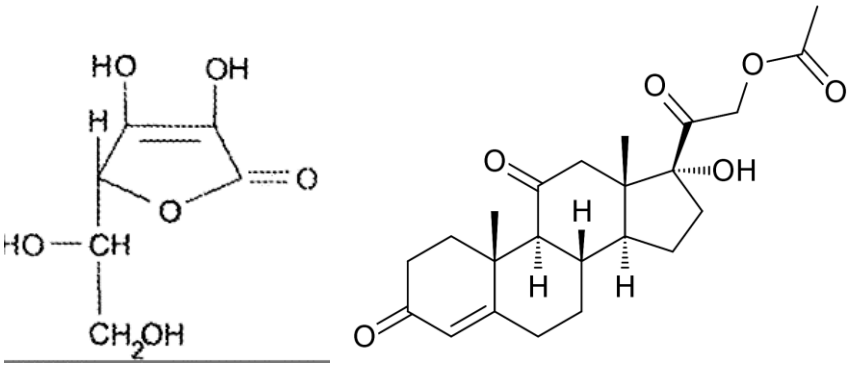
Ethanol. Acetic acid Present the characterization of pharmaceutical substances in accordance with the algorithm

Algorithm for pharmaceutical substance characterization:

1. Latin name, chemical formula
2. Description, solubility
3. Qualitative analysis. Identification
4. Methods of quantitative determination, their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer
5. Storage conditions due to physical and chemical properties and the influence of the external environment
6. Medical use, dosage forms

Example of control No. 1

Ascorbic acid. Cortisone Acetate. Present the characterization of pharmaceutical substances in accordance with the algorithm



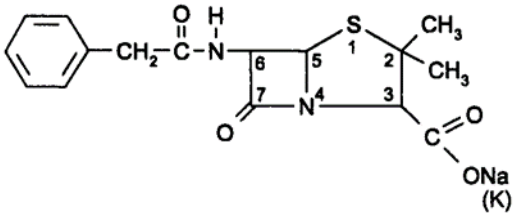
Algorithm for pharmaceutical substance characterization:

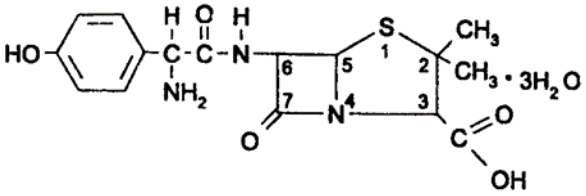
1. Latin name, chemical formula
2. Functional groups
3. Description, solubility

4. Qualitative analysis
5. Methods of quantitative determination, their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer
6. Storage conditions due to physical and chemical properties and the influence of the external environment
7. Medical use, dosage forms

Example of control No. 2

1. Benzylpenicillin sodium (potassium) salt. Amoxicillin trihydrate (Flemoxin). Present the characterization of pharmaceutical substances in accordance with the algorithm



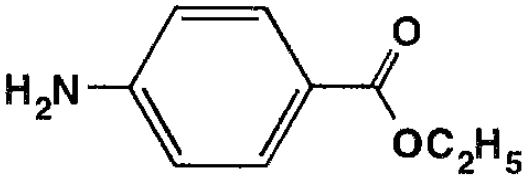


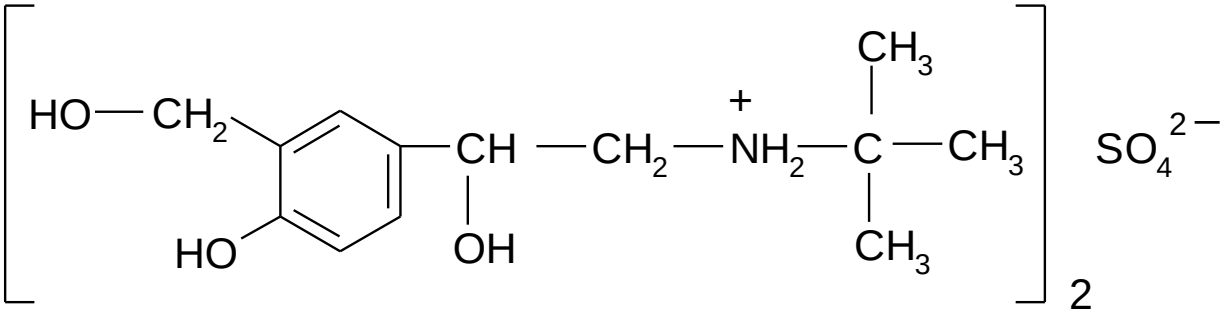
Algorithm for pharmaceutical substance characterization:

1. Latin name, chemical formula
2. Functional groups
3. Description, solubility
4. Qualitative analysis
5. Methods of quantitative determination, their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer
6. Storage conditions due to physical and chemical properties and the influence of the external environment
7. Medical use, dosage forms

Example of control No. 3

1. Benzocaine. Salbutamol sulfate. Present the characterization of pharmaceutical substances in accordance with the algorithm

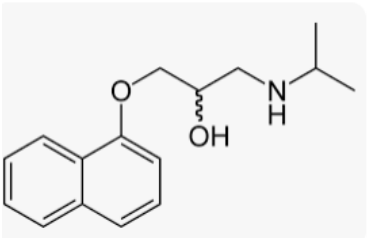


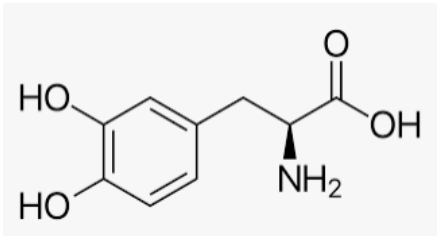


Algorithm for pharmaceutical substance characterization:

1. Latin name, chemical formula
2. Functional groups
3. Description, solubility
4. Qualitative analysis
5. Methods of quantitative determination, their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer
6. Storage conditions due to physical and chemical properties and the influence of the external environment
7. Medical use, dosage forms

1. Propranolol. Levodopa. Present the characterization of pharmaceutical substances in accordance with the algorithm





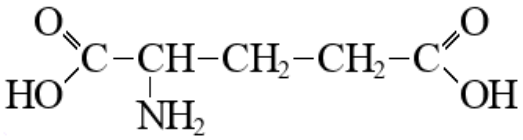
Algorithm for pharmaceutical substance characterization:

1. Latin name, chemical formula
2. Functional groups
3. Description, solubility
4. Qualitative analysis
5. Methods of quantitative determination, their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer
6. Storage conditions due to physical and chemical properties and the influence of the external environment

7. Medical use, dosage forms

EVALUATION OF THE CONTROL ANSWER
Control work No. 1, 2.
Questions 1 - 2 are evaluated by 33 points (with the step of 5 points).
Questions 3 is evaluated by 34 points (with the step of 5 points).
Total: 2 x 33 + 34 = 100 points.
Control work No. 3,4,5 + 1,2,3,4
Questions 1-2 are evaluated by 50 points.
Total: 2 x 50 = 100 points.
Example of exam ticket

Example of exam ticket
1. Determination of drug purity: characterization of the appearance and solubility of drugs. Possible changes due to improper storage.
2. Sodium thiosulfate. Provide a complete characterization of the pharmaceutical substance using the algorithm.
3. Glutamic acid. Provide a complete characterization of the pharmaceutical substance using the algorithm.



Algorithm for the characterization of an inorganic pharmaceutical substance
1. Description, solubility and physical properties, proof of authenticity based on general and specific chemical properties.
2. Methods of quantitative determination: justification, chemical reactions, titration conditions, indicator, equivalent.
3. Storage conditions due to chemical properties and the influence of environmental factors, medical use.
Algorithm for characterization of an organic pharmaceutical substance
1. Chemical structure and functional groups of the molecule.
2. Description, solubility and physical properties, proof of authenticity based on general and specific chemical properties.
3. Methods of quantitative determination: justification, chemical reactions, titration conditions, indicator, equivalent. Physical and chemical methods.
4. Storage conditions due to chemical properties and the influence of environmental factors, medical use.

EVALUATION OF EXAM ANSWER
The question card of the exam paper consists of 3 questions.
Questions 1 is evaluated by 20 points.
Questions 2-3 are evaluated by 40 points.
Total: 10 + (2 x 40) = 100 points.

EVALUATION OF COURSE POINTS

Total: 100 points.

GENERAL PHARMACEUTICAL TECHNOLOGY

Teachers: Ass.Prof. Svetlana Kamaeva
Building, Department, classroom: Amirkhana, 16, Department of Pharmaceutical Technology, 408, 404

Contact details:
Telephone number: 89600801619 (Kamaeva Svetlana)
E-mail address: farm64@bk.ru
Office and working hours: 409 (8-18)

Course: 3
Term (Semester): 5,6
Total 216 hours
Lectures 32 hours.
Practical exercises 90 hours.
Independent work of 58 hours.
Exam 6 semester (36 hours)
. Credit units of labor input (ZET) 6

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Laboratory practical classes and training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher. Also they contain experimental scientific research activities. It requires the use of special equipment, facilities and materials in classroom. This kind of training to be held in teaching laboratories.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (http:// https://e.kazangmu.ru/course/view.php?id=1777#section-0 https://e.kazangmu.ru/course/view.php?id=364).

Course objectives:
Main goal of mastering the discipline is the formation of systemic knowledge, skills in the development and manufacture of medicines and drugs in various dosage forms, as well as the organization of pharmaceutical production, pharmacies, small, medium and large enterprises.
Pharmaceutical technology studies state regulation of drug production, solid, liquid and soft dosage forms, sterile and aseptic manufactured dosage forms, herbal preparations, alternative

dosage forms, general principles for organizing the production of finished drugs; standardization of herbal, natural and chemical drugs according to GMP requirements; organization of development and improvement of technologies for the production of solid, soft and liquid dosage forms in the conditions of industrial, small-scale and individual production, sterile and aseptically manufactured dosage forms, herbal preparations, non-traditional dosage forms. Pharmaceutical technology interconnects the various stages of development and the laws of a general and private nature when receiving medicines: therapeutic, prophylactic, rehabilitation, diagnostic, homeopathic, veterinary and cosmetic preparations. Pharmaceutical technology regulates the quality assurance of medicines, taking into account pharmaceutical factors and bioavailability, carries out licensing and certification of medicines, compilation of permissive regulatory documentation (Pharmacopoeia, Federal Standards, industrial regulations), taking into account current legislative documents.

General Pharmaceutical technology studies the production of solid, liquid and soft dosage forms, sterile and aseptically manufactured dosage forms under conditions of pharmacy and in bigger production conditions. This manual reflects the issues the extemporaneous production of drugs for individual prescriptions and requirements of medical institutions.

General Pharmaceutical Technology is a core subject, forming attitudes and logical thinking in matters of Pharmacology specialist with higher education – the pharmacist. In the process of studying this discipline a student masters the proper professional competences for the production of various drugs.

Pharmaceutical technology studies state regulation of drug production, solid, liquid and soft dosage forms, sterile and aseptic manufactured dosage forms, herbal preparations, alternative dosage forms, general principles for organizing the production of finished drugs; standardization of herbal, natural and chemical drugs according to GMP requirements; organization of development and improvement of technologies for the production of solid, soft and liquid dosage forms in the conditions of industrial, small-scale and individual production, sterile and aseptically manufactured dosage forms, herbal preparations, non-traditional dosage forms. Pharmaceutical technology interconnects the various stages of development and the laws of a general and private nature when receiving medicines: therapeutic, prophylactic, rehabilitation, diagnostic, homeopathic, veterinary and cosmetic preparations. Pharmaceutical technology regulates the quality assurance of medicines, taking into account pharmaceutical factors and bioavailability, carries out licensing and certification of medicines, compilation of permissive regulatory documentation (PhM, industrial regulations), taking into account current legislative documents.

Tasks of the discipline:

The challenges of pharmaceutical technology as specialized academic disciplines are:

- teaching students the activities of a pharmacist based on the study of the theoretical laws of the processes for obtaining and converting drugs and excipients into dosage forms;
- the formation of students' practical knowledge, skills and abilities of manufacturing medicines, as well as assessing the quality of raw materials, intermediates and finished medicines;
- developing students' ability to choose the most effective and rational medicines and therapeutic systems based on the modern biopharmaceutical concept adopted in world

practice, as well as on the development of the technology of selected dosage forms and standardizing documentation for them.

Course topics: V term

Calendar plan of lectures

1 Dosage form, its biopharmaceutical and technological and economic properties. Classification of dosage forms. Dosing by weight, volume, drops. Solid dosage forms. General characteristics of powders. Definition. Dispersion of powders. Dosing. Powders. The theoretical foundations of grinding. Screening. The main technological stages and rules for the preparation of powders. Simple and complex powders. Powders with hard-to-grind substances, dusty substances.

2 Powders with poisonous, narcotic and potent substances. Triturations.

3 Liquid dosage forms. General characteristics, classification. The main positions of the theory of dissolution. Aqueous true solutions. Special cases of making solutions. Manufacturing of concentrated solutions. Calculations for strengthening and dilution of concentrated solutions. Mixtures. Mixtures with aromatic waters.

4 Non-aqueous solutions. Classification of non-aqueous solvents. Non-aqueous solutions on volatile and non-volatile solvents. Alcohol solutions.

5 Manufacturing of liquid dosage forms by diluting of standard pharmacopoeial liquids.

6 Colloidal solutions. Definition. Characteristic. Technology. High molecular weight substances solutions. Definition. Classification. Characteristic. Features of the technology of High molecular weight substances solutions. Suspensions as a dosage form. The main methods of obtaining suspensions. Stabilizers and stabilizers. Quality control.

7 Emulsions as a dosage form. Definition. Characteristic. Theoretical basis. Emulsifiers. Introduction of medicinal substances into emulsions. Seed and oil emulsions.

8 Infusions and decoctions. Characteristic. Classification. The use of the main positions of the theory of the extraction process when obtaining aqueous extracts. Infusions and decoctions. The technology of infusions and decoctions, depending on the content of active ingredients in the raw material. Preparation of aqueous extracts using extracts - concentrate.

Calendar plan of laboratory classes

1. Introduction to the specialty. Compliance with the requirements of the sanitary and pharmaceutical regime in the pharmacy. Classification of dosage forms. Dosing by weight. Scales. Dosing rules by mass of substances of different consistency. Dosing by volume. Pharmacy utensils
2. Solid dosage forms. General characteristics of powders. Definition. Dispersion of powders. Powders. The theoretical foundations of grinding. Screening. The main technological stages. Rules for the preparation of powders. Simple and complex powders. Powders with hard-to-grind substances, dusty substances.
3. Powders with poisonous, narcotic and potent substances. Triturations.
4. Manufacturing of complex powders with dye substances, extracts, liquids. Module No. 1 (control work).
5. Liquid dosage forms. General characteristics, classification. The main positions of the theory of dissolution. Aqueous true solutions. Special cases of making solutions.

Manufacturing of concentrated solutions. Calculations for strengthening and dilution of concentrate solutions. Mixtures. Mixtures with aromatic waters.

6. Non-aqueous solutions. Classification of non-aqueous solvents. Alcohol solutions.
7. Colloidal solutions. Technology. Solutions of substances with HMW. Definition. Classification. Characteristic. Features of the technology of HMW substances solutions. Suspensions as a dosage form. The main methods of obtaining suspensions. Stabilizers and stabilizers. Quality control. Manufacturing of emulsions. Principles of introducing medicinal substances in emulsions. Seed and oil emulsions.

9 Infusions of decoctions. Characteristic. Classification. The use of the main provisions of the theory of the extraction process when obtaining aqueous extracts. Infusions and decoctions. The technology of infusions and decoctions, depending on the content of active ingredients in the raw material. Preparation of aqueous extracts using special extracts - concentrates.

8. Module No. 2 (control work).

Course topics: VI term

Plan of lectures on general pharmaceutical technology for the VI semester

1. Soft dosage forms. Characteristic. Classification. Liniments as a dosage form. General characteristics. Classification. Liniment technology. Ointment bases
2. Ointments as a dosage form. General characteristics. Classification. Primary requirements. Characteristics of the main groups of excipients used in the manufacture of ointments. Methods for introducing medicinal substances into bases. Ointments are homogeneous, heterogeneous, technology features. Biopharmaceutical characteristics of ointments. Quality control. Improvement of ointments as a dosage form
3. Rectal dosage forms. Classification. Suppositories as a dosage form. Biopharmaceutical characterization. Classification. primary requirements. Suppository bases. Classification. Characteristics of the main groups of bases. Production of suppositories by rolling, pouring, pressing
4. Pills as a dosage form. Characteristics and role of excipients. Receiving methods. Quality control
5. Creation of aseptic conditions in the pharmacy. Obtaining water for injection. Stabilization of solutions for injections. Theoretical foundations for the choice of stabilizers. Particular cases of stabilization of injection solutions. Technology of injection and infusion solutions
6. Calculation of isotonic concentrations. Dosage forms for the eyes. General characteristics. Classification. Requirements for ophthalmic dosage forms. Technology of ophthalmic dosage forms in pharmacy conditions. Quality control. Ways to improve ophthalmic dosage forms
7. Incompatible combinations in dosage forms
8. Dosage forms used in veterinary medicine. Characteristic. Nomenclature. Features of the technology of specific dosage forms for animals. Improvement of veterinary dosage forms. Basic principles of homeopathy. Homeopathic remedies (essences, tinctures. Manufacturing features. Basic principles of homeopathy (granules, powders, solutions, ointments). Homeopathic remedies. Manufacturing features

Lesson plan on general pharmaceutical technology
for the VI semester

1. Soft dosage forms. Characteristic. Classification. Liniments as a dosage form. General characteristics. Classification. Liniment technology. Ointment bases. Ointments (homogeneous, heterogeneous, combined)
2. Rectal dosage forms. Classification. Suppositories as a dosage form. Biopharmaceutical characterization. Classification. Primary requirements. Suppository bases. Classification. Characteristics of the main groups of bases. Production of suppositories by rolling, pouring and pressing methods
3. Pills as a dosage form. Characteristics and role of excipients. Receiving methods. Quality control. Pills with oxidizers
4. Control work
5. Stabilization of solutions for injections. Theoretical foundations for the choice of stabilizers. Particular cases of stabilization of injection solutions. Technology of injection and infusion solutions
6. Calculation of isotonic concentrations. Dosage forms for the eyes. General characteristics. Classification. Requirements for ophthalmic dosage forms. Technology of ophthalmic dosage forms in pharmacy conditions. Quality control. Ways to improve ophthalmic dosage forms
7. Dosage forms for newborns, dosage forms with antibiotics.

Control work

8. Incompatible combinations in dosage forms

Final testing

9. Certification of practical skills

Text books and required supplies:

1. 1.Pharmaceutical technology. Technology of dosage forms : a textbook for students of higher educational institutions / I. I. Krasnyuk, S. A. Valevko, T. V. Mikhailova [et al.] ; ed. I. I. Krasnyuk, G. V. Mikhailova. – 3rd ed., revised and additional – Moscow : Publishing center «Academy», 2007. – 592 p.
2. Kamaeva S.S. General pharmaceutical technology : teaching aid for students studying specialty 33.05.01 Pharmacy in English / S. S. Kamaeva, G. U. Merkureva ; Kazan State Medical University Ministry of Health of the Russian Federation. – Kazan : KSMU, 2023. – 152 p.

List of additional literature

1. Pharmaceutical technology. Technology of dosage forms : hands. to pract. Occupations : textbook. allowance / I. M. Krasnyuk [et al.]. – Moscow : GEOTAR-Media, 2012. – 544 p.
2. Federal Law «On the Circulation of Medicines» dated 12.04.2010 N 61-FZ.
3. Order of the Ministry of Health of the Russian Federation of 2023 No. 249n «On approval of the rules for the manufacture and dispensing of drugs for medical use by pharmacy organizations, individual entrepreneurs licensed for pharmaceutical activity».

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid".

Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of module No. 1.

Written control

You must write characterization of drug form, theoretical foundation of technology, calculations, technology of drug form, Passport of written control (PWC), it's back side, packaging, label and storage of drug form.

1. Rp.: Papaverini hydrochloridi 0,05
   Anaesthesini 0,15

Misce fiat pulvis
Da tales doses N. 10
Signa. For 1 powder 2 times a day orally

2. Rp.: Aethylmorphini hydrochloridi 0,0002
Analgini 0,3
Sacchari 0,2
Misce fiat pulvis
Signa. For 1 powder 3 times a day orally

EVALUATION OF THE MODULE ANSWER
On each lesson students have the mark for practical work. In Module 1 4 classes
Total for classes 4x10= 40 points
On Module 1 students have in classroom 20 tests on Educational portal – 20 points.
On Module 1 students have 2 theoretical questions, each task is evaluated by 20 points.
Total: 2 x 20 = 40 points
Total for Module 1 100 points

Example of module No. 2
Example of ticket

You must write characterization of drug form, theoretical foundation of technology, calculations, the technology of drug form, Passport of written control (PWC), it's back side, packaging, label and storage of drug form.

1. Recipe: Solutionis Natrii bromidi 3% – 200,0
Barbitali-natrii 2,0
Glucosi 5,0
Adonizidi 10,0
Tincturae Valerianae 20,0
Misce. Da. Signa. By 1 teaspoon 2 times a day orally

2. Recipe: Emulsii oleosae 180,0
Camphorae 2,0
Analgini 3,0
Misce. Da. Signa. By 1 teaspoon 3 times a day orally

EVALUATION OF THE MODULE ANSWER
On each lesson students have the mark for practical work. In Module 2 4 classes
Total for classes 4x10= 40 points
On Module 2 students have in classroom 20 tests on Educational portal – 20 points.
On Module 1 students have 2 theoretical questions, each task is evaluated by 20 points.
Total: 2 x 20 = 40 points
Total for Module 2 100 points

Example of module No. 3
Control work - Example of task

Ticket number 1
You must write characterization of drug form, theoretical foundation of technology, calculations, the technology of drug form, Passport of written control (PWC), it's back side, packaging, label and storage of drug form.

1. Rp.: Mentholi 0,2
Vaselini 10,0
Misce fiat unguentum
Da. Signa. Ointment for nose

2. Rp.: Analgini 0,1
Olei Cacao quantum satis ut fiant suppositoria rectalia
Da tales doses numero 20
Signa. By 1 suppositorium 1 time a day per rectum

3. Recipe: Theophyllini 0,27
Massae pilularum quantum satis ut fiat pilulae numero 30
Da. Signa. By 1 pill 2 times a day
4. Recipe: Papaverini hydrochloridi 0,3
Massae pilularum quantum satis ut fiat pilulae numero 30
Da. Signa. By 1 pill 2 times a day orally

5.Rp.: Zinci oxydi 0,15
Olei Cacao quantum satis ut fiant suppositoria rectalia
Da tales doses numero 3
Signa. By 1 suppositorium 2 times a day per rectum

EVALUATION OF THE MODULE ANSWER
On each lesson students have the mark for practical work. In Module 3 3 classes
Total for classes 3x10= 30 points
On Module 3 students have in classroom 20 tests on Educational portal – 20 points.
On Module 3 students have 5 theoretical questions, each task is evaluated by 10 points.
Total: 5 x 10 = 50 points
Total for Module 3 100 points

Example of module No. 4
CONTROL WORK

Example of Ticket

Ticket number 1

You must write characterization of drug form, theoretical foundation of technology, calculations, the technology of drug form, Passport of written control (PWC), it's back side, packaging, label and storage of drug form.

1.Recipe: Sol. Glucosi 10% – 100,0
Sterilizetur!
Da. Signa. For intraveneous infusions

2.Recipe: Solutionis Acidi borici 1% – 10.0
Zinci sulfatis 0,03
Novocaini 0,05
Da. Signa. By 2 drops 3 times a day in both eyes
3.Recipe: Solutionis Acidi glutaminici 1% – 100.0
Da. Signa. By 1 teaspoon 3 times a day for newborn baby
4.Recipe: Solutionis Natrii bromidi 1% – 100.0
Da. Signa. By 1 teaspoon 3 times a day for newborn baby
5.Recipe: Solutionis Acidi ascorbinici 0.5% – 10.0
Glucosi 0,1
Da. Signa. By 2 drops 3 times a day in both eyes

EVALUATION OF THE MODULE ANSWER
On each lesson students have the mark for practical work. In Module 4 3 classes
Total for classes 3x10= 30 points
On Module 4 students have in classroom 20 tests on Educational portal – 20 points.
On Module 4 students have 5 theoretical questions, each task is evaluated by 10 points.
Total: 5 x 10 = 50 points
Total for Module 4 100 points

EXAM
EXAM has 2 stages:

Stage 1 – level 1 – assessment of knowledge + Level 2 - assessment of proficiency

Stage 2 - Level 3 skill assessment

Example of ticket on STAGE 1 of exam

Kazan State Medical University
of the Ministry of Health of the Russian Federation
Institute of Pharmacy
Exam on Pharmaceutical technology
Ticket number 1
Level 1 - knowledge assessment
1. Give an answer to the theoretical question:

1.1.Suppositories as a dosage form. Suppository bases and it's classification. Requirements for them. Manufacturing methods of suppositories in a pharmacy.

10 points

Level 2 assessment of proficiency- solving situational cases

Level 2 - solving situational cases (Each case is estimated at 10 points).
The situational case is described according to the following algorithm:
write the prescription in Latin;
determine the type of dosage form;
make a pharmaceutical analysis (control doses if necessary etc.);
make the necessary calculations;
describe the theoretical points of technology of the drug;
describe the type of packaging of the medicinal product and design of the label for dispensing;
describe the technology of the medicinal product according to the individual prescription;
set the quality criteria for the manufactured product;
write the passport of written control;
set the expiration date of the manufactured product.
2. Case on the topic "Powders".
2.1.Rp.: Acidi nicotinici 0,05
Acidi ascorbinici 0,1
Glucosi 0,15
Misce fiat pulvis
Da tales doses N. 20
Signa. By 1 powder 2 times a day orally

3. Case on the topic "Liquid dosage forms".
3.1. Recipe: Solutionis Natrii bromidi 4%-100,0
Barbitali-natrii 2,5
Misce. Da. Signa. By 1 teaspoon 2 times a day orally

4. Case on the topic "Soft dosage forms".
4.1.Recipe: Mentholi 0,5
Olei Persicori 5,0
Vaselini 30,0
Misce fiat unguentum
Da. Signa. To put under the bandage

5. Case on the topic "Aseptically manufactured dosage forms"

5.1. Recipe: Sol. Glucosi 10% - 500,0
Sterilizetur!
Da. Signa. For injections

Note: The maximum number of points for answering on a ticket is 50 points (5 questions x 10 points = 50)
level 2 - assessment of proficiency - maximum 50 points

level 3 - certification of practical skills - maximum 50 points

STAGE 2 - LEVEL 3 SKILL ASSESSMENT

Example of case for STAGE 2 skill assessment
Prepare the drug form, package and label it

Rp.: Mentholi 0,1
Dimedroli 0,05
Streptocidi 0,3
Lanolini
Vaselini ana 10,0
Misce fiat unguentum
Da. Signa. To spread under the bandage

Check list
For evaluation of skills in pharmaceutical technology
at the stage of certification of practical skills
Name of student_____

No.	Practical skill	Criteria for evaluation	Points
1	Using pharmaceutical technology reference material	Did not use reference material	0
		Used reference material, but does not know it	6
		Does not work well with reference material	7
		Made inaccuracies in the use of reference data	8
		did everything, but made minor inaccuracies that did not affect the quality of the drug	9
		did everything right	10
2	Practical skills in conducting the technological process	Did not get to work	0
		Started to work, but does not focus on the workplace, does not give the correct answer	6
		It works unsatisfactorily (demonstrated incorrect practical skills in manufacturing drug form, made gross errors in the answer)	7
		He did not perform all the necessary actions, and with errors (incorrectly holds the scales, did not handle the bar, etc.)	8
		did everything, but made minor inaccuracies that did not affect the quality of the drug (wiped the bar with cotton wool, etc.)	9
		did everything right	10
3	The theoretical justification of the technology of the dosage form	Did not proceed to answer	0
		Proceeded to answer, but does not give the correct answer	6
		did not give a theoretical justification; made gross errors in the answer	7
		Gave a theoretical justification, but with errors	8
		Gave a theoretical justification, but made small inaccuracies that do not affect the quality of the drug	9
		did everything right	10
4	Packaging and labeling	did not proceed to design drug form	0
		started to make a label, but does not give the correct answer	6
		incorrectly label for vacation, made gross errors in the answer	7
		Has not done all the necessary actions, but with obvious errors	8
		did everything, but made minor inaccuracies that did not affect the quality of the drug	9
		did everything right	10

5	PWC, calculations	student did not proceed to the design of the PWC	0
		I started to draw up the PPC, but does not navigate in the calculations, the design of the PPC, does not give the correct answer	6
		Incorrectly issued PPK, made gross errors in the calculations	7
		Has not done all the necessary actions, but with obvious errors	8
		did everything, but made minor inaccuracies that did not affect the quality of the drug	9
		did everything right	10
TOTAL points for certification of practical skills on general pharmaceutical technology			50

Total mark_____

The final mark for the exam is 100 points (50 points for stage 1 for ticket + 50 points for stage 2 practical skills).
Final Certification is conducted according to accepted in Kazan State Medical University rating system.
90-100 points - excellent,
80-89 points - well, good
70-79 points - satisfactory,
69 points or less - unsatisfactory.

PHARMACOLOGY

Teachers: PhD R.R.Kamaliev
Building, Department, classroom: educational building, 16 Amirkhana Ave, 3rd floor, room No 315, 310, 308
Contact details:
Telephone number: +79503224468
E-mail address: rafis.kamaliev@kazangmu.ru
Office and working hours: Mon-Sat 9-15

Total hours — 360:
- Lectures 52 hours;
- Practical classes 150 hours;
- Independent work 122 hours;
- Control 36 hours

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.

Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=454).

Course objectives: The purpose of mastering the discipline
Tasks of the discipline:
Knowledge formation:
classification and basic characteristics of drugs;
pharmacodynamics and pharmacokinetics;
indications and contraindications to the use of medicines;
side effects;
general principles of prescriptions of medicines.
Development of skills:
analyse the effect of medicines according to the totality of their pharmacological effects and the possibility of their use for therapeutic treatment;
write prescriptions for medicines in certain diseases and pathological processes, based on the features of their pharmacodynamics and pharmacokinetics.
Formation of skills:
prescribing medicines in the treatment of various diseases and pathological processes in the adult population.

Course topics:
The course is focused on the study of general principles and regularities of pharmacology, specific features of the action of drugs and preparations belonging to different pharmacological groups (classification, mechanisms of action, pharmacological effects, indications and contraindications for use, side effects of drugs).

Thematic plan of lectures
the 4^{h} semester

1. Pharmacokinetics
2. Drug–Receptor Interactions and Pharmacodynamics
3. The Autonomic Nervous System
4. Cholinergic Agonists
5. Cholinergic Antagonists
6. Adrenergic Agonists
7. Adrenergic Antagonists
8. Drugs for Neurodegenerative Diseases

the 5th semester

1. Antihypertensives
2. Heart Failure
3. Antiarrhythmics
4. Anticoagulants and Antiplatelet Agents
5. Pituitary and Thyroid
6. Drugs for Diabetes

7. Estrogens and Androgens
8. Drugs for Disorders of the Respiratory System

the 6th semester

1. Drugs for Anemia
2. Anti-inflammatory, Antipyretic, and Analgesic Agents
3. Principles of Antimicrobial Therapy
4. Cell Wall Inhibitors
5. Protein Synthesis Inhibitors
6. Quinolones, Folic Acid Antagonists, and Urinary Tract Antiseptics
7. Antimycobacterial Drugs
8. Antifungal Drugs
9. Antiviral Drugs

Thematic plan of practical classes

the 4h semester

1 Pharmacokinetics 1
2 Drug–Receptor Interactions and Pharmacodynamics 2
3 Test 1 Principles of Drug Therapy
4 The Autonomic Nervous System 3
5 Cholinergic Agonists 4
6 Cholinergic Antagonists 5
7 Adrenergic Agonists 6
8 Adrenergic Antagonists 7
9 Test 2 Drugs Affecting the Autonomic Nervous System
10 Drugs for Neurodegenerative Diseases 8
11 Anxiolytic and Hypnotic Drugs 9
12 Antidepressants 10
13 Antipsychotic Drugs 11
14 Drugs for Epilepsy 12
15 Anesthetics 13
16 Opioids 14
17 Test 3 Drugs Affecting the Central Nervous System

the 5th semester

Antihypertensives 17
2 Diuretics 18
3 Heart Failure 19
4 Antiarrhythmics 20
5 Antianginal Drugs 21
6 Anticoagulants and Antiplatelet Agents 22
7 Drugs for Hyperlipidemia 23
8 Test 4 Drugs Affecting the Cardiovascular System
9 Pituitary and Thyroid 24
10 Drugs for Diabetes 25

11 Estrogens and Androgens 26
12 Adrenal Hormones 27
13 Test 5 Drugs Affecting the Endocrine System
14 Drugs for Disorders of the Respiratory System 29
15 Antihistamines 30
16 Gastrointestinal and Antiemetic Drugs 31

the 6th semester

1 Drugs for Anemia 33
2 Anti-inflammatory, Antipyretic, and Analgesic Agents 34
3 Test 6 Drugs for Other Disorders
4 Principles of Antimicrobial Therapy 37
5 Cell Wall Inhibitors 38
6 Protein Synthesis Inhibitors 39
7 Quinolones, Folic Acid Antagonists, and Urinary Tract 40
8 Antimycobacterial Drugs 41
9 Test 7 Chemotherapeutic Drugs: antibiotics
10 Antifungal Drugs 42
11 Antiprotozoal Drugs 43
12 Anthelmintic Drugs 44
13 Antiviral Drugs 45
14 Anticancer Drugs 46
15 Immuno suppressants 47
16 Test 8 Chemotherapeutic Drugs: other
17 Final test MCQ s

Text books and required supplies:

1. Kharkevich D.A. Pharmacology. Textbook for medical students / Translation of Russian textbook «Pharmacology» (2017), 12th edition, revised and improved. – Moscow, GEOTAR-Media, 2018. – 672 p.
2. Alyautdin, R. N. Pharmacology. Illustrated textbook / ed. R. N. Alyautdin. - Москва : ГЭОТАР-Медиа, 2020. - 312 с. - ISBN 978-5-9704-5665-1. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970456651.html

Evaluation and grading:

Rating system for assessing student performance

The progress of students is assessed according to the rating system for assessing knowledge according to order of the Rector of the Kazan State Medical University.

The final rating of the discipline is calculated in points (70-100) using a special computer program and is the sum of four components, each of which is assigned a specific weight:

Rating components	Types of educational activity	Weight, %
1. Academic hours	Presence in the lectures and practical classes	10

2. Results of all modules and final test control	Average of all modules	35
3. Assessment of class marks	Average of all class marks	10
4. Exam	Result of exam	45
	Total	100

1. Academic hours. The volume of hours completed is calculated in % of the maximum number of classroom hours of the curriculum for the discipline. In the computer program for calculating the final rating, the number of classroom hours of lectures and practical classes missed by the student, as well as the number of hours of missed lectures and practical classes worked are entered.
If a student misses more than 50% of the classroom hours according to the curriculum (71 hours), the discipline is not certified, and the student must study the discipline again in full.
2. Results of all modules and final test control. The final results of all modules (control works) are entered into the computer program. The entire discipline "Pharmacology" is divided into 8 modules, which are distributed by semester as follows:
3 semester:
1. Principles of Drug Therapy
2. Drugs Affecting the Autonomic Nervous System
3. Drugs Affecting the Central Nervous System
4 semester:
4. Drugs Affecting the Cardiovascular System
5. Drugs Affecting the Endocrine System
5 semester:
6. Drugs for Other Disorders
7. Chemotherapeutic Drugs: antibiotics
8. Chemotherapeutic Drugs: other
At the end of each module, a control test is carried out with a score in points. The control test on the module is passed until a positive mark is obtained (70-100 points).
Upon completion of the study of the entire discipline, computer testing is carried out in all sections of pharmacology. The result of this test is also entered into the computer program for calculating the final rating.
3. Assessment of class marks. The arithmetic mean value of all current assessments in practical classes is calculated, which were set in accordance with the scale: "unsatisfactory" - 6 points; "satisfactory" - 7 points; "good" - 8 points; "very good" - 9 points; "excellent" -10 points.
In the computer program for calculating the final rating, the arithmetic mean value of the current grades in practical classes for the 5th and 6th semester is entered separately.
4. Result of the examination.
A positive mark on the exam is given in the range of 70-100 points. If a student does not attend the exam the score is not set and the rating is not calculated.
The exam is conducted in an oral form. 45 minutes is given for a completing notes
Students will need to orally answers to 5 topics, 20 points can be earned max for each topic. Each answer must include:
- Classification of the drugs with all available drug names and groups

- Mechanism of action
- Pharmacological effects
- Indications
- Common side effects

The maximum number of points is 100 points.

The final score of the exam and the results of the final rating for the discipline will be announced to all students the same day

Example of module No. 1. Principles of Drug Therapy

Pharmacokinetics: routes of drug administration, absorption of drugs, drug distribution, drug clearance through metabolism, drug clearance by the kidney and other routes, design and optimization of dosage regimen

Example of module No. 2. Drugs Affecting the Autonomic Nervous System

Cholinergic Agonists: the cholinergic neuron, cholinergic receptors, direct-acting cholinergic agonists, indirect-acting cholinergic agonists: anticholinesterase agents, toxicology of anticholinesterase agents

Example of module No. 3 Drugs Affecting the Central Nervous System

Drugs for Neurodegenerative Diseases: neurotransmission in the CNS, synaptic potentials, overview of Parkinson's disease, drugs used in Parkinson's disease, drugs used in Alzheimer's disease, drugs used in multiple sclerosis, drugs used in amyotrophic lateral sclerosis

Example of module No. 4 Drugs Affecting the Cardiovascular System

Antihypertensives: etiology of hypertension, diuretics, β-adrenoceptor–blocking agents, ace inhibitors, angiotensin ii receptor blockers, renin inhibitor, calcium channel blockers, α-adrenoceptor–blocking agents, α-/β-adrenoceptor–blocking agents, centrally acting adrenergic drugs, vasodilators, hypertensive emergency, resistant hypertension, combination therapy

Example of module No. 5 Drugs Affecting the Endocrine System

Pituitary and Thyroid: hypothalamic and anterior pituitary hormones, hormones of the posterior pituitary, thyroid hormones

Example of module No. 6 Drugs for Other Disorders

Drugs for Disorders of the Respiratory System: adrenergic agonists, corticosteroids, anticholinergic, leukotriene modifiers, antihistamines (H_1-receptor blockers), α-adrenergic agonists, agents for cough

Example of module No. 7 Chemotherapeutic Drugs: antibiotics

Cell Wall Inhibitors: penicillins, cephalosporins, carbapenems, monobactams, β-lactamase inhibitors, vancomycin, daptomycin, telavancin, fosfomycin, polymyxins

Example of module No. 8 Chemotherapeutic Drugs: other

Antifungal Drugs: subcutaneous and systemic mycotic infections, drugs for cutaneous mycotic infections

«Example of exam ticket»
Pharmacology exam paper
Please prepare an oral answer for the following questions.
Student
name:_____
Drug–Receptor Interactions and Pharmacodynamics: signal transduction, dose–response relationships, intrinsic activity, quantal dose–response relationships
Drugs for Epilepsy: etiology of seizures, classification of seizures, antiepilepsy medications, status epilepticus, women's health and epilepsy
Antihypertensives: etiology of hypertension, diuretics, β-adrenoceptor–blocking agents, ace inhibitors, angiotensin ii receptor blockers, renin inhibitor, calcium channel blockers, α-adrenoceptor–blocking agents, α-/β-adrenoceptor–blocking agents, centrally acting adrenergic drugs, vasodilators, hypertensive emergency, resistant hypertension, combination therapy
Antihistamines: H_1 antihistamines, histamine H_2-receptor blockers
Antiviral Drugs: treatment of respiratory viral infections, hepatic viral infections, herpesvirus infections, HIV (NRTIS, NNRTIS, protease inhibitors, entry inhibitors, integrase inhibitors)

«Evaluation of exam answer»
Total marks for the oral answer_____ (100 out of 100)
The final result for the exam _____(out of 100)

MEDICAL AND PHARMACEUTICAL COMMODITY SCIENCE

Teacher: Assistant of Institute of Pharmacy Voronina Elizaveta Alexandrovna
Building, Department, classroom #: Institute of Pharmacy, Amirkhana, 16, room 303
Contact details:
Telephone number: +7 (843) 5213953 (Evseeva Elena Vyacheslavovna)
E-mail address: 2367492@mail.ru
Office and working hours: 313 (9-16)
Class hours:
Total 252 h:
Lectures - 32 hours;
Practical classes – 112 hours;
Independent work (self-study) – 72 hours;
Control – 36 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Practical classes are usually devoted to detailed study of specific topics and it is being held in each academic group separately. They involve active participation of students in problem discussion. It requires preliminary preparation by the student.

Self-study is work with the special literature or teaching materials (literature sources, video and audio material, multimedia programs) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=2257).

The purpose of mastering the discipline.

The purpose of the discipline "Medical and pharmaceutical commodity science" is the formation of students' commodity analysis thinking, the development of skills in commodity analysis, in marketing research of medical and pharmaceutical products, to determine influences of storage conditions, of the types of packaging ,on the quality of medical and pharmaceutical products, to make the objective conclusions about possibility of using different products and items in medical and pharmaceutical practice.

Tasks of the discipline.

1. To study the fundamentals and basic principles of commodity science, to establish samples for the formation of consumer properties and quality of medical, as well as pharmaceutical products, factors that form and preserve quality of medical, as well as pharmaceutical products.
2. To form the practical skills and abilities for determination of rational ways for the preservation of products during transportation, storage, operation, for solving the main tasks of providing the population with high-quality, effective and safe medicines, medical devices and items, as well as disinfectants, items and personal hygiene products, different items for medical purposes, items and products which are intended for care of the sick people, newborns and children under the age of three years, spectacle optics and means for their care, mineral waters, medicinal, children's and dietary food, biologically active additives, perfumery and cosmetic products, medical and sanitary-educational printed publications intended to promote a healthy lifestyle (hereinafter referred to as pharmacy products).
3. To develope students' skills and abilities to carry out acceptance control of admitted medicines and other products of the pharmacy range, check and registration of accompanying documents in the prescribed manner.

Course topics:

Calendar plan of lectures (5th semester):

1. Introduction to medical and pharmaceutical commodity science. Basic concepts and definitions.
2. Medical products and their properties. Materials science.
3. Classification and coding of medical and pharmaceutical products.
4. Standardization of medicinal products. Metrology.
5. Containers, packaging and labeling of medical and pharmaceutical products.
6. General requirements for storage and transportation of medical and pharmaceutical products.
7. Storage of various groups of medicinal products.
8. Basics of commodity analysis. Commodity analysis of cutting general surgical instruments.

Calendar plan of lectures (6th semester):

1. Commodity analysis of mineral waters.
2. Commodity analysis of medical, dietary and children’s products.
3. Commodity analysis of perfumery and cosmetic products.

4. Commodity analysis of oral care products.
5. Commodity analysis of items and means of caring for newborns and children under the age of three.
6. Commodity analysis of disinfectants and personal protective equipment.
7. Marketing research of medical and pharmaceutical products.
8. The procedure for concluding contracts for the supply of medicines and medical devices.

Calendar plan of practical classes (5th semester):
1. Medical products and their properties. Materials science.
2. Classification and coding of medical and pharmaceutical products.
3. Containers, packaging and labeling of medical and pharmaceutical products.
4. General requirements for storage and transportation of medical and pharmaceutical products.
5. Storage of various groups of medicinal products.
6. Basics of commodity analysis. Commodity analysis of cutting general surgical instruments.
7. Commodity analysis of clamping general surgical instruments.
8. Commodity analysis of other general surgical instruments (expanding, pushing back, probing).
9. Commodity analysis of obstetric-gynecological and urological instruments.
10. Commodity analysis of otorhinolaryngological instruments.
11. Commodity analysis of dental instruments.
12. Commodity analysis of ophthalmic instruments.
13. Commodity analysis of spectacle optics and care products for it.
14. Commodity analysis of instruments and apparatus for injections, punctures and transfusions.
15. Commodity analysis of suture materials, medical needles.
16. Commodity analysis of medical diagnostic devices and apparatus.
17. Commodity analysis of rubber products.
18. Commodity analysis of dressings and ready-made dressings.

Calendar plan of practical classes (6th semester):
1. Commodity analysis of mineral waters.
2. Commodity analysis of medical, dietary and children's products.
3. Commodity analysis of perfumery and cosmetic products.
4. Commodity analysis of oral care products.
5. Commodity analysis of items and means of caring for newborns and children under the age of three.
6. Commodity analysis of dietary supplements and homeopathic medicines.
7. Commodity analysis of medicines acting on the central nervous system.
8. Commodity analysis of medicines acting on the cardiovascular system.
9. Commodity analysis of medicines for the treatment of nonspecific diseases of the lungs and digestive organs.
10. Commodity analysis of chemotherapy medicines.
11. Commodity analysis of hormonal medicines.
12. Commodity analysis of medicinal products used in veterinary medicine.
13. Commodity analysis of disinfectants and personal protective equipment.
14. Analysis of the assortment of medical and pharmaceutical products.

15. Segmentation of the market for medical and pharmaceutical products. Three-level product analysis.
16. Positioning of medical and pharmaceutical products. Marketing strategies.
17. Life cycle of medical and pharmaceutical products. Assessment of the competitiveness of medical and pharmaceutical products.
18. The procedure for concluding contracts for the supply of medicines and medical devices.

Textbooks and required supplies:

1. Narkevich I.A. Medical and Pharmaceutical Commodity Science: textbook / edited by I. A. Narkevich. - Moscow: GEOTAR-Media, 2022. - 528 p. - ISBN 978-5-9704-6590-5. - Text: electronic // Electronic library system "Student consultant" : [site]. - URL : https://www.studentlibrary.ru/book/ISBN9785970465905.html
2. Kabatov Yu.F. Medical Commodity Science / Yu. F. Kabatov, P. E. Krendal. — 3rd edition, revised and supplemented — Moscow: Medicine, 1984. — 383 p.: il.: 22 cm — (Ed. lit.).; ISBN In translation (In translation).
3. Vasnetsova, O. A. Medical and Pharmaceutical Commodity Science: textbook / Vasnetsova, O. A. - — 2nd edition, revised and supplemented - Moscow: GEOTAR-Media, 2009. - 608 p. - ISBN 978-5-9704-1106-3. - Text: electronic // Electronic library system "Student consultant": [site]. - URL : https://www.studentlibrary.ru/book/ISBN9785970411063.html
4. Medical and pharmaceutical commodity science: educational and methodical manual for English-speaking students of the 3rd course of faculty of International students (specialty 33.05.01 “Pharmacy”) / Kazan State Medical University Ministry of Health of the Russian Federation; compiler: E.A. Voronina – Kazan; KSMU, 2022 – 73 p.

Evaluation and grading:

Monitoring progress is carried by the end of each module and final test. Discipline “Medical and Pharmaceutical Commodity Science” includes 3 modules.

Routine performance assessment (tests during classes) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”.
Unsatisfactory mark during routine performance evaluation or absence (including lectures) is considered to be a student academic debt. In order to rework the debt, student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher.

Exams are held in written form on paper. Exam tickets with questions are given to each student. Grading: 0–69 – “poor”, 70-79 – “satisfactory”, 80-89 – “good”, 90-100 – “excellent”.
Student is given not more than 2 additional attempts to pass exam in the additional session within the timeframes set by the University. Failure is leading to dismissal from the University.

Overall student rating is build up from lecture and class attendance, test results, modules, final test result and exam.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during breaks
- Using phone is allowed only during breaks

Example of module No. 1. Introduction to Medical and Pharmaceutical Commodity Science

1. Choose correct definition of a product.

A. A property or characteristic of an object by which it is produced

B. A product of labor intended for sale in order to satisfy any social need

C. A science that studies the structure and properties of raw materials

D. A machine-readable symbol that contains encoded information about the characteristics of a manufactured product

2. Which group of properties of medical products is wrong here?

A. Social

B. Ergonomic

C. Mechanical

D. Safety

E. Environmental

3. What is barcode?

A. a machine-readable symbol that contains encoded information about the characteristics of a manufactured product and allows its automated identification

B. the set of rules and methods for coding classification groupings and objects of classification of a given set

C. a sign or a set of signs used to name a classification grouping and / or object of classification

D. a property or characteristic of an object by which it is produced

4. Choose a correct definition for primary packaging.

A. containers that have direct contact with the products

B. containers for protection of the primary packaging and rational accounting of products

C. containers in which products are delivered from the manufacturer to distribution points or to the consumer

D. devices which are used to seal containers or finished products

5. At what temperature range must immunobiological medicines be stored?

A. 15-25 ℃

B. 2-8 ℃

C. 8-15 ℃

D. At room temperature

Evaluation of module No. 1. Introduction to Medical and Pharmaceutical Commodity Science
50 questions are given in the form of tests (MCQ). For each question 2 points are given. Total amount of possible points – 100. Less than 70 points – "unsatisfactory" mark; 70-79 points – "satisfactory"; 80-89 – "good"; 90-100 – "excellent".

Example of module No. 2. Medical Commodity Science
1. Cutting general surgical instruments: scalpels and knives. Their types, material from which they are made.
2. Conduct a commodity analysis of a medical instrument "Abdominal retractor", make a conclusion about its possible use.
3. Conduct a commodity analysis of a medical item "Rubber syringe", make a conclusion about its possible use.

Evaluation of module No. 2. Medical Commodity Science
3 questions are given in the ticket: 1 theoretical and 2 practical. For theoretical question 20 points are given. Practical questions are evaluated 40 points each. Total amount of possible points – 100. Less than 70 points – "unsatisfactory" mark; 70-79 points – "satisfactory"; 80-89 – "good"; 90-100 – "excellent".

Example of module No. 3. Pharmaceutical Commodity Science
1. Dietary supplements. Classification. Requirements for packaging, labeling, storage.
2. Enzyme, hepatoprotective, choleretic and litholytic medicines. Classification. Assortment. Application. Trade names. Dosage forms.
3. Conduct a commodity analysis of a medicine Omeprazole. Indicate its group and subgroup.

Evaluation of module No. 3. Pharmaceutical Commodity Science
3 questions are given in the ticket: 2 theoretical and 1 practical. For first theoretical question 20 points are given, for second – 35 points. Practical question is evaluated in amount of 45 points. Total amount of possible points – 100. Less than 70 points – "unsatisfactory" mark; 70-79 points – "satisfactory"; 80-89 – "good"; 90-100 – "excellent".

Final test for the subject Medical and Pharmaceutical Commodity Science
1. Choose one wrong biological factor which can affect medical and pharmaceutical products.
A. Temperature
B. Rodents
C. Microorganisms
D. Insects

2. Which mirror/specula does not exist?
A. for the heart
B. abdominal by Doyenne
C. renal by Fedorov
D. renal by Folkman
E. for the lungs

3. For which purpose a pharmacy spatula is used?
A. For preparation of suppositories
B. For taking the soft materials, like ointments
C. For pushing pack the tongue
D. For examination of oral cavity

4. Simvastatin, Atorvastatin, Rosuvastatin – medicines of which group?
A. Lipid-modifying medicines
B. Medicines for stenocardia
C. Antihypertensives
D. Antidepressants
E. Nootropics

5. Choose one correct answer. Name correct example(s) for the intermediate-acting insulins.
A. Insulin lispro, Insulin aspart
B. Insulin degludec
C. Insulin isophane
D. Insulin detemir, Insulin glargine
E. Insulin glulisine

6. What kind of assortment cannot be met in the average or large pharmacy?
A. Enlarged
B. Expanded
C. Minimal
D. Simple
E. Complex

7. Name stages of life cycle by correct order.
A. Introduction, growth, maturity, decline
B. Introduction, growth, maturity, failure
C. Introduction, maturity, growth, decline
D. Maturity, growth, decline, introduction
E. Decline, growth, introduction, maturity

Evaluation of Final test for the subject Medical and Pharmaceutical Commodity Science
100 questions are given in the form of tests (MCQ). For each question 1 point is given. Total amount of possible points – 100. Less than 70 points – “unsatisfactory” mark; 70-79 points – “satisfactory”; 80-89 – “good”; 90-100 – “excellent”.

Example of exam ticket.
Examination ticket 2
1. Coding of medical and pharmaceutical products. Barcode – classification, structure and methods of decoding barcodes.

2. Otorhinolaryngological instruments: cutting and tracheotomy instruments. Appointment, types, quality control (tests), material for production. Conduct a commodity analysis of a medical instrument “Adenotome”.
3. Hormonal medicines: medicines of sex hormones. Hormonal contraceptives. Assortment, trade names. Dosage forms. Application. Packaging, labeling, storage.

Evaluation of exam answer
An exam ticket is given to each student on exam. In each ticket 3 questions are present. 2 questions are theoretical and are evaluated by 25 points each. 1 question has theoretical and practical part in it and is evaluated by 50 points. Total amount of possible points – 100. Less than 70 points – “unsatisfactory” mark; 70-79 points – “satisfactory”; 80-89 – “good”; 90-100 – “excellent”.

PHARMACOGNOSY

Teachers: Ryumin Sergey Denisovich, Shprenger Julia Clausovna
Building, Department, classroom: Institute of Pharmacy (Fatiha Amirhana street, 16) classroom 209,316,318.
Contact details:
- Telephone number: 89655934983 (Ryumin S.D.)
- E-mail address: ryumin-2000@list.ru
-

Total hours: 360 h
Lectures – 52 hours;
Practical classes – 152 hours;
Independent work – 120 hours;
Control – 36 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (http://www.kgmu.kcn.ru:40404/moodle/login/ index.php).__

Course objectives: The purpose of mastering the discipline

The purpose of mastering the discipline of pharmacognosy to give students the necessary knowledge, skills and abilities in the field of procurement, acceptance, authentication and quality assessment of medicinal plant raw materials and medicinal plant preparations
Tasks of the discipline:

Course objectives: The purpose of mastering the discipline
The purpose of mastering the discipline is to provide students with the necessary knowledge, skills and abilities in the field of procurement, acceptance, determination of authenticity and quality assessment of medicinal plant raw materials (MPR) and medicinal herbal preparations (MHP).
Objectives of mastering the discipline:
acquisition of theoretical knowledge on the general principles of procurement of medicinal plant materials and measures to protect natural exploited thickets of medicinal plants; morphological and anatomical diagnostic features of medicinal plant materials; biosynthesis pathways of the main groups of biologically active substances of medicinal plants, the main patterns of the relationship between the structure and properties of these compounds, methods of their isolation from plant material, qualitative and quantitative analysis in samples of medicinal plant materials; the use of drugs of plant and animal origin in medical practice;
development of the ability to accept medicinal plant materials and medicinal products, select samples necessary for analysis; use macroscopic and microscopic methods of analysis to determine the authenticity of medicinal plant materials and medicinal products; use methods of phytochemical analysis to determine the authenticity and quality of medicinal plant materials and medicinal products in accordance with state quality standards, legislative and regulatory documents;
development of the ability to conduct independent analytical and research work and perform individual research and applied scientific tasks to develop new methods and technologies in the field of pharmacy.

Course topics:
3rd year
5th semester
Calendar plan of lectures

1. Introduction to pharmacognosy. Basic concepts and objects of study of pharmacognosy. Classification systems of medicinal plant raw materials. Standardization of medicinal plant raw materials. Methods of pharmacognostic analysis.
2. Basic concepts of biochemical processes of plant organism. Primary and secondary metabolites. The main pathways of biogenesis of biologically active substances of plants.
3. Terpenes, classification. Biogenesis of different classes of terpenes. Mono- and sesquiterpenes - main components of essential oils. Classification, physicochemical properties. Methods of quantitative determination of essential oils in MPR. Preparation of essential oils.
4. Diterpenes: classification, physico-chemical properties, methods of isolation from plant raw materials, qualitative and quantitative determination in the forest products.

5. Iridoids and other monoterpene glycosides: classification, physicochemical properties, methods of isolation from plant raw materials, qualitative and quantitative determination in WRS.
6. Saponins: classification, physicochemical properties, methods of isolation from plant raw materials, qualitative and quantitative determination in MPR.
7. Cardiac glycosides: classification, physicochemical properties, methods of isolation from plant material, qualitative and quantitative determination in MPR.
8. Carotenoids: classification, physicochemical properties, methods of isolation from plant raw materials, qualitative and quantitative determination in MPR.
9. Phenolic compounds of plants: classification, biogenesis. Simple phenolic compounds (phenols, phenylmethanoids, phenylethanoids): classification, physicochemical properties, methods of isolation from plant raw materials, qualitative and quantitative determination in MPR. Phenylpropanoids: classification, physicochemical properties, methods of isolation from plant raw materials, qualitative and quantitative determination in MPR.

Calendar plan of laboratory classes

1. Medicinal plant material "Leaves". Determination of authenticity by macroscopic and microscopic methods of analysis. Leaves of lingonberry vulgaris, bearberry, birch, coltsfoot, buckthorn, buckthorn, eucalyptus rod, lily of the valley. Determination of the authenticity and good quality of Nettle leaves.
2. Medicinal plant material "Leaves". Determination of authenticity by macroscopic and microscopic methods of analysis. The leaves of a three-leafed watch, dioecious nettle, large plantain, pink catharanthus, stamen orthosiphon, ginkgo bilobate. Determination of the authenticity and good quality Peppermint leaves.
3. Medicinal plant material "Leaves". Determination of authenticity by macroscopic and microscopic methods of analysis. The leaves of peppermint, medicinal sage, senna, digitalis purpurea and woolly, aloe tree (fresh and dry), thallus kelp. Determination of the authenticity and good quality of threshed raw materials: sage, senna.
4. Medicinal plant material "Flowers". Determination of authenticity by macroscopic and microscopic methods of analysis. Flowers of the immortelle sand, hawthorn, black elderberry, blue cornflower, meadowsweet, linden, medicinal marigolds, tansy, chamomile, lily of the valley. Columns with stigmas of corn. Determination of the authenticity and good quality of the medicinal marigold and chamomile flowers.
5. Control work on the «Determination of crushed and powdered raw materials of the group "leaves" and "flowers" using determinants of medicinal plant materials».
6. Medicinal plant material "Herbs". Determination of authenticity by macroscopic and microscopic methods of analysis. The grass of the mountaineer pepper, pochechny, avian, centaury, St. John's wort, spring adonis, evading peony, creeping Tribulus, violets, small periwinkle. Determination of the authenticity and good quality of Yarrow herbs, Melilot,
7. Medicinal plant material "Herbs". Determination of authenticity by macroscopic and microscopic methods of analysis. The grass of bitter wormwood, marshmallow cinnamon, ordinary yarrow, a series of three-parted, flat-headed godson, purple coneflower, lanceolate thermopsis, sweet clover, shepherd's purse ordinary, jaundice

sprawling, marsh mallow, belladonna. Determination of the authenticity and good quality of belladonna grass, Purple conflower

8. Medicinal plant material "Herbs". Determination of authenticity by macroscopic and microscopic methods of analysis. Common marjoram, medicinal lemon balm, motherwort, thyme, thyme ordinary, field horsetail, celandine celandine, Macleia, yellow fly, shoots of marsh rosemary, horsetail ephedra, fresh aloe vera, fresh Kalanchoe. Determination of the authenticity and goodness of motherwort herb, thyme and Equisetum steam.
9. Medicinal plant material "Fruits". Determination of authenticity by macroscopic and microscopic methods of analysis. The fruits of chokeberry aronia (fresh and dry), hawthorn, laxative joster, fresh viburnum, Chinese schisandra, raspberry, common juniper, common rowan, black currant, wild cherry, blueberry, sea buckthorn, buckthorn, peppercorns, peppercorns common, ergot horns. Determination of the authenticity and good quality of the Juniperus fruits, rose hips.
10. Medicinal plant material “Fruits”, “Seeds”, “Buds”. Determination of authenticity by macroscopic and microscopic methods of analysis. Fruits of anise ordinary, coriander, caraway seeds, dill, fennel ordinary, large and toothy ammonia, spotted milk thistle. Seeds of horse chestnut, Schisandra chinensis, sowing flax, strophanthus, pumpkin. Buds of birch, Scotspine, poplar. Determination of the authenticity and good quality of linseed, Caraway fruits.
11. Control work on the «Determination of crushed and powdered raw materials of the group "herbs", "fruits", "seeds" and "buds" using the determinants of medicinal plant material».
12. Medicinal plant material "Bark". Determination of authenticity by macroscopic and microscopic methods of analysis. Bark of oak, guelder-rose, buckthorn alder. Chaga. Determination of the authenticity and good quality of oak bark, alder buckthorn.
13. Medicinal plant material "Roots, rhizomes, bulbs, tubers, corms". Determination of authenticity by macroscopic and microscopic methods of analysis. The roots of marshmallow, medicinal dandelion, licorice, horse sorrel, Manchurian aralia, common barberry, real ginseng, snake rauwolfia, restharrows, burdock. Rhizomes and roots of elecampane tall, peony evading, prickly Eleutherococcus. Determination of the authenticity and good quality of the roots of dandelion officinalis, licorice.
14. Medicinal plant material "Roots, rhizomes, bulbs, tubers, corms". Determination of authenticity by macroscopic and microscopic methods of analysis. Rhizomes of calamus swamp, frankincense, serpentine, cinquefoil erect. Rhizomes with the roots of Valerian officinalis, cyanosis blue, dioscorea Nippon, podophyllus, raponticum safflower, hellebore Lobel. Rhizomes and roots of the hemorrhage officinalis, madder, Rhodiolarosea. Determination of the authenticity and good quality of rhizomes with roots of Valerian, rhizomes of Polygonum bistorta.
15. Control work on the «Determination of crushed and powdered raw materials of the “cortex” group and “roots, rhizomes, bulbs, tubers, corms” using medicinal plant material determinants».
16. Certification of practical skills.

6th semester

Calendar plan of lectures

1. Coumarins and chromones: classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination in medicinal plant materials.
2. Flavonoids: classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination in medicinal plant materials.
3. Tannins: classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination in medicinal plant materials. Lignans: classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination in medicinal plant materials.
4. Anthracene derivatives: classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination in medicinal plant materials.
5. Alkaloids: biogenesis, classification, physicochemical properties, methods of isolation from plant materials, qualitative and quantitative determination in medicinal plant materials.
6. Polysaccharides: classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination in medicinal plant materials.
7. Organic acids: classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination in medicinal plant raw material.
8. Ascorbic acid: physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination in medicinal plant materials.
9. Lipids: classification, physico-chemical properties. Obtaining and analysis of fats (fatty oils) and fat-like substances.
10. Tocopherols: classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination in drugs.

Calendar plan of laboratory classes

1. Terpenes. Classification, biogenesis. Monoterpenous and sesquiterpenic. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination. Pharmacopoeia methods for the determination of essential oils in raw materials. Quantitative determination of the essential oil in the leaves of peppermint and leaves of the eucalyptus.
2. Essential oils. Physico-chemical properties, methods of isolation from plant materials. Analysis of essential oils. Determination of the authenticity and good quality of essential oils - essential oil of peppermint leaves and essential oil of eucalyptus leaves. Cardiac glycosides. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination.
3. Saponins. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination. Qualitative determination of saponins in rhizomes with cyanosis roots. Quantitative determination of glycyrrhizin to-you in licorice roots.
4. Cardiac glycosides. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination.
5. Control work on topic "Terpenes"

6. Phenol compounds. Classification, biogenesis. Simple phenolic compounds (phenols, phenylmethanoids, phenylethanoids). Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination. TLC - identification of arbutin in the leaves of bearberry and lingonberry. Quantification of arbutin in bearberry and lingonberry leaves.
7. Phenylpropanoids. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination. Quantitative determination of the amount of phenolic compounds in the herb of lemon balm. Coumarins and chromones. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination. The qualitative identification of furocoumarins in ammi fruits is large.
8. Flavonoids. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination. TLC - identification of flavonoids in medicinal plant raw material (marigold flowers, thyme grass, grass of the mountaineer and bird's hypericum). Quantitative determination of the amount of flavonoids in medicinal plant raw material (marigold flowers, thyme grass, grass of the mountaineer bird and hypericum).
9. Tannins. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination. Qualitative identification of tannins in the oak bark, rhizomes and roots of the blood slurry, rhizomes of incense and alder fruit. Quantitative determination of the amount of tannins in the oak bark, rhizomes and roots of the hemorrhage, rhizomes of incense and alder fruit. Lignans. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination.
10. Anthracene derivatives. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination. Quantitative determination of the amount of anthracene derivatives in buckthorn bark, horse sorrel roots, roots of a rhubarb danyne, fruits of a laxative joster.
11. Control work on topic "Phenol compounds"
12. Alkaloids. Classification, biogenesis, physicochemical properties, methods of isolation from plant materials, qualitative and quantitative determination. Qualitative identification of alkaloids in the grass of belladonna vulgaris. Quantitative determination of the amount of alkaloids in the grass of belladonna vulgaris.
13. Polysaccharides. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination.Quantitative determination of polysaccharides in burdock roots and rhizomes and roots of elecampane high.
14. Lipids. Classification. Fixed oils. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination. Fatty oils - castor, corn, linseed, almond, olive, peach, sunflower, soy. Beeswax, lanolin. Lecithin. Determination of the authenticity and good quality of fatty oils - castor, olive, peach.
15. Organic acids. Classification, physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination. Vitamin C. Physico-chemical properties, methods of isolation from plant materials, qualitative and quantitative determination. Quantitative determination of ascorbic acid in rose hips and the amount of organic acids in fruits of mountain ash.

16. Control work on the "Alkaloids and basic of primary and mixed biosynthesis"

4th year
7th semester

Calendar plan of lectures

1. Medicinal plants containing essential oils with a predominance of monoterpenes: raw material base, chemical composition, standardization, pharmacological activity, application and preparations.
2. Medicinal plants containing essential oils with a predominance of sesquiterpenes: raw material base, chemical composition, standardization, pharmacological activity, application and preparations.
3. Medicinal plants containing cardiac glycosides and saponins: raw material base, chemical composition, standardization, pharmacological activity, application and preparations.
4. Medicinal plants containing simple phenols. phenylpropanoids, anthracene derivatives: raw material base, chemical composition, standardization, pharmacological activity, application and preparations.
5. Medicinal plants containing flavonoids: raw material base, chemical composition, standardization, pharmacological activity, application and preparations.
6. Medicinal plants containing lignans, flavolignans, tannins: raw materials, chemical composition, standardization, pharmacological activity, use and preparations.
7. Medicinal plants containing alkaloids: raw material base, chemical composition, standardization, pharmacological activity, application and preparations.
8. Medicinal plants containing polysaccharides, lipids, organic acids and vitamins: raw materials, chemical composition, standardization, pharmacological activity, application and preparations.

Calendar plan of laboratory classes

1. Ways of using medicinal plants in medicine. Dosage forms of preparations from herbal raw materials.
2. Medicinal plants containing essential oils. Sowing coriander, peppermint, eucalyptus, common sage, common caraway, dill, juniper, common pine, common hops, valerian officinalis, chamomile, wormwood, yarrow, swamp calamus, common wild rosemary, wild rosemary, thyme, oregano, common anise, common fennel.
3. Medicinal plants containing monoterpene glycosides (iridoids), sesquiterpene glycosides and cardiac glycosides. Centaury common and beautiful, motherwort five-lobed and cordial, medicinal dandelion, foxglove, Combe strophanth and attractive, May lily of the valley, Keiske and Transcaucasian, spring adonis.
4. Medicinal plants containing saponins, ecdysteroids and carotenoids. Licorice naked and Ural, Manchurian aralia, horse chestnut, real ginseng, dioscorea nippon, creeping tribulus, safflower raponticum, buckthorn buckthorn.
5. Module "Medicinal plants containing terpenoids of different classes"
6. Medicinal plants containing simple phenols, phenylmethanoids, phenylethanoids, phenylpropanoids, coumarins and chromones. Common lingonberry. Bearberry, Rhodiola rosea. peony evading, stinging nettle, lemon balm, echinacea purpurea, eleutherococcus prickly, sweet clover, large ammonia, carrot-shaped visnaga.

7. Medicinal plants containing anthracene derivatives, lignans, flavolignans, xanthones. Buckthorn brittle, laxative joster, narrow-leaved and holly-leaved cassia, dye madder and Georgian madder, St.
8. Medicinal plants containing flavonoids. Black chokeberry, sandy immortelle, drooping and fluffy birch, species of hawthorn, black elderberry, ginkgo two-bladed, peppermint, bird knotweed, common corn, Lespedeza two-color, Amur maakia, medicinal marigolds, shepherd's purse, common tansy, common tansy, common tansy , a series of three-part, tricolor and field violet, common blueberry.
9. Medicinal plants containing tannins and melanins Big-leaved badan, common oak, snake mountaineer, medicinal burnet, erect cinquefoil, marsh cinquefoil, buckthorn buckthorn, gray and sticky alder, bird cherry, chaga.
10. Module "Medicinal plants containing phenolic compounds of different classes"
11. Medicinal plants containing alkaloids. Annual pepper, horsetail ephedra, flat-leaved rosewood, belladonna vulgaris, lanceolate thermopsis, common barberry, heart-shaped and small-fruited macleia, yellow mackerel, celandine, white-tailed and northern aconite, pink catharanthus, small periwinkle, rauwolfia snake
12. Medicinal plants containing polysaccharides, organic acids, vitamins, lipids. Althea officinalis and Armenian, flax, common linden, coltsfoot, common plantain, sugary and Japanese kelp, tree aloe, Kalanchoe pinnate, viburnum, common mountain ash, black currant, species of rose hips, types of pumpkin.
13. Module "Medicinal plants containing alkaloids, polysaccharides, organic acids, vitamins, lipids."
14. Offset

Text books and required supplies:

Main literature:

1. William Charles Evans Trease and Evans Pharmacognosy/ William Charles Evans – 16 ed.: Saunders Ltd., 2009 — 2075 p.
2. European pharmacopoeia, 11 edition. Access mode: https://pheur.edqm.eu/home

Additional literature:

1. Kurkin V.A. Pharmacognosy: textbook – 2nd ed. additional and revised. - Samara: LLC "Etching", GOVPO "SamSMU Roszdrava", 2007. – 1239 p.
2. Pharmacognosy. Medicinal raw materials of plant and animal origin: a textbook / edited by G.P. Yakovlev. 2nd ed. ispr. and additional – St. Petersburg: SpetsLit, 2010. – 863 p

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other) Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in

other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

EXAMPLE OF MODULE 1 - 3.

Task 1

Determine the crushed and powdered raw materials by microscopic features (in the task 2 samples).

Task 2

Give the name of the medicinal plant raw material in Latin (the assignment contains 5 types medicinal plant raw material).

Task 3

Give the name of the plant in Latin from the photos (the assignment contains pictures of 5 plants)

EVALUATION OF THE MODULE ANSWER

The first task is valued at 20 points.

There are 2 objects in the task. Each guessed object gives 10 points.

If the object is guessed with 1 attempt, 10 points are given.

If the object is guessed on the 2nd attempt, 8 points are given.

If the object is guessed on 3 attempts, 6 points are given.

If the object is not guessed on 3 attempts, 0 points are given.

In the second task five objects are given.

A maximum of 2 points is given for each object.

If the Latin name of the raw material is written without mistakes, 2 points are given.

If there are minor grammatical errors in the Latin name of raw materials, 1 point is given.

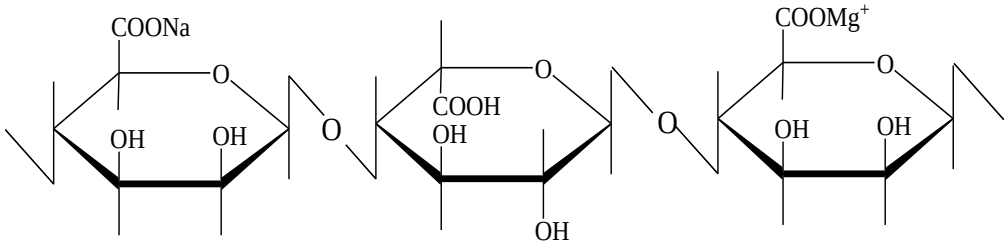
If the errors are gross or the raw material is defined incorrectly, 0 points are given.

The maximum number of points for the task is 10.

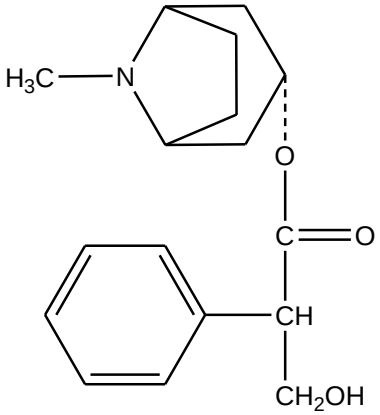
In the third task photographs of 5 plants are given.

For each correctly identified plant and correctly written Latin name of the plant a maximum of 2 points is given.
If the Latin name of the plant is written without mistakes, a maximum of 2 points is given.
If there are minor grammatical errors in the Latin name of the plant, 1 point is given.
If the errors are gross or the plant is defined incorrectly, 0 points are given.
The maximum number of points for the task is 10.
Maximum score for all tasks 40 points. The scores are then converted into percentages, which shows the final score for the 100-point assessment.
A student must achieve a minimum of 28 points to pass the module, which equates to 70%.

EXAMPLE OF MODULE 4 - 6.
To which class of natural compounds does the compound of the formula below belong?



Based on the chemical structure of this compound, give a description of its physicochemical properties (state of aggregation, color, solubility, ability to absorb UV light, optical activity, etc.).
The chemical formula of hyoscyamine is given below. What class of natural compounds does it belong to? The belladonna grass is standardized by GF XIV in terms of the amount of alkaloids in terms of hyoscyamine. Explain this pharmacopoeial technique. Write down the possible chemistry of the reactions (using hyoscyamine as an example) that take place in this technique.



Belladonnae herba
An analytical sample of the raw material is crushed to the size of the particles passing through a sieve with holes with a diameter of 1 mm. About 10.0 g (accurately weighed) of the crushed raw material is placed in a flask with a capacity of 250 ml, 150 ml of ether, 7 ml of ammonia solution are added and the mixture is stirred for 1 hour. The ether extract is quickly filtered through cotton wool into a flask with a capacity of 200 ml, covering the funnel with a watch glass. 5 ml of water is added to the filtrate, shaken vigorously and left until the ether layer is clarified, after which 90 ml of ether extraction is measured using a graduated cylinder into a 200 ml separatory funnel. The cylinder is rinsed twice with ether in portions of 10 ml, which are attached to the

measured ether extraction (solution 1). The ether extraction is treated with a 1% solution of hydrochloric acid in portions of 20, 15, 10 ml (sample with Mayer reagent), each time filtering through a 5 cm diameter paper moistened with water filter into a second separatory funnel of the same capacity. The filter is washed twice with a 1 ml 5 ml hydrochloric acid solution, adding the washing liquid to the total acid recovery.

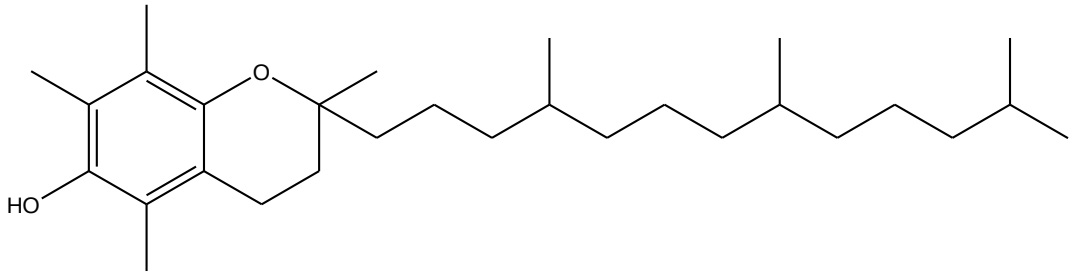
Acidic extraction is made alkaline with an ammonia solution to an alkaline reaction with phenolphthalein and treated successively with 20, 15, 10 ml of chloroform, shaking for 3 minutes. Chloroform extracts are filtered into a distillation flask with a capacity of 100 ml through a paper filter on which 4-5 g of freshly calcined anhydrous sodium sulfate moistened with chloroform are preliminarily placed. The filter is washed twice with 5 ml chloroform. Chloroform is distilled off in a water bath to a volume of 1-2 ml, the remainder of the chloroform in the flask is removed by blowing air until the smell of solvent completely disappears. The dry residue is dissolved in 15 ml of hydrochloric acid of a solution of 0.02 M when heated in a water bath, 2 drops of an alcohol solution of methyl red and 1 drop of a solution of methylene blue are added and excess hydrochloric acid is titrated with sodium hydroxide solution of 0.02 M until a green color appears.

The content of the total alkaloids in terms of hyoscyamine in absolutely dry raw materials in percent (X) is calculated by the formula:

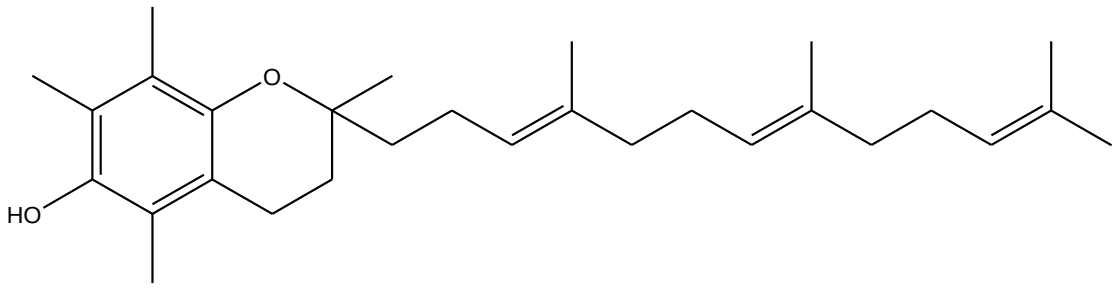
$$X = \frac{(15 - V) \cdot 0{,}005780 \cdot 100 \cdot 100}{a \cdot (100 - W)},$$

where 0,005780 - the number of alkaloids in terms of hyoscyamine, corresponding to 1 ml of hydrochloric acid solution of 0.02 M; V is the volume of sodium hydroxide solution of 0.02 M spent on titration, ml; a - a sample of raw materials corresponding to the measured volume of ether extraction, g; W is the moisture content of the raw material,%.

What classes of natural compounds include compounds whose formulas are given below?



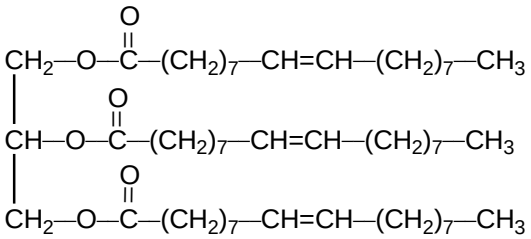
1

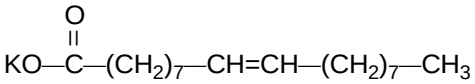


2

Based on the chemical structure of these compounds, give a comparative description of their physicochemical properties (state of aggregation, color, solubility, ability to absorb UV light, optical activity, etc.).

What classes of natural compounds include compounds whose formulas are given below?





According to the Russian Pharmacopoeia, one of the indicators of the quality of fatty oils is the absence of impurities of paraffin, wax, tar and mineral oils, and soaps in them. Explain the methods for determining these impurities. Write down the possible chemistry of the reactions taking place in these methods.

Paraffin, wax, tar and mineral oils

1.0 g of the test fatty oil was placed in a flat-bottomed flask with a capacity of 50 ml, 10 ml of potassium hydroxide alcohol solution of 0.5 M was added and heated under reflux in a water bath with periodic stirring for 15 minutes. After cooling to room temperature, 25 ml of water was added to the reaction liquid and stirred. The resulting liquid should be transparent.

Soaps

The determination of soap in non-drying fatty oils (almond, peach, etc.) intended for the preparation of solutions for parenteral administration is carried out according to the following procedure.

About 5.0 g (accurately weighed) of the fatty oil is burned in a porcelain crucible and calcined. The balance should not exceed 0.01%. 1 ml of freshly boiled water is added to the residue in the crucible, dissolved by heating in a water bath and 2 drops of a 1% phenolphthalein solution are added. The liquid should not be stained, or a faint pink stain should quickly disappear.

In fatty oils intended for internal and external use and not intended for the preparation of solutions for parenteral administration, the determination of soap is carried out according to the following procedure: 50 ml of water are placed in a conical flat-bottomed flask with a capacity of 250 ml, 10 drops of 1% phenolphthalein solution are added and boiled on a tile within 1 min, while the liquid should be colorless. Then, 5.0 g of oil is added to hot water, shaken and boiled for 5 minutes, after which the emulsion flask is cooled to room temperature. The flask was placed on a sheet of white paper and 10 more drops of a phenolphthalein solution of 1% were added. The water layer should be colorless.

EVALUATION OF THE MODULE ANSWER

There are 4 assignments in the module. For each assignment 25 points are given.

Total 25*4=100 points.

EXAMPLE OF MODULE 7 – 9.

Describe medicinal raw materials according to the scheme:

1. Latin name of raw material, plant, family
2. Characteristics (Description of the plant, where this plant grows and is cultivated)
3. Main chemical components
4. Standardization
5. Pharmacological action
6. Medicines containing this raw material

Coriander seed fruit
Chamomile flowers
Licorice roots

EVALUATION OF THE MODULE ANSWER

Each item in the scheme, according to which the raw material is described, is scored 5 scores. There are 6 points in the scheme, 3 types of raw materials. Total: 6×3×5 = 90 scores. The third (for example Licorice roots) type of raw materials has a large number of pharmacological actions and preparations, so they are given 5 additional scores for the 5th and 6th points of the scheme. Total: 90 + 5 +5 = 100 scores.

COURSE WORK

Requirements for coursework

The volume of the course work is 25-30 pages of printed text (excluding the title page, bibliographic list and appendices).

The structure of the course work contains the following elements:

- title page;
- content;
- designations and abbreviations (if necessary);
- introduction;
- objects and research methods
- main part;
- conclusion;
- keywords;
- bibliographic list;
- application (s) (if necessary)

3. The work is drawn up in the form of text made on a computer using a text editor and printed on a printer on sheets of A4 white paper (210 x 297 mm) on one side of the sheet.

The text on the sheet must be in portrait orientation, landscape orientation is allowed only for applications in the form of tables or diagrams.

Font - Times New Roman, size - 14, line spacing - 1.5, paragraph indent - 1.25 cm, alignment - in width.

The main font color is black. Margins: top, bottom - 2 cm, right - 1.5 cm, left - 3 cm.

The distance between the title of the sections and the following text, between the chapter headings and paragraphs should be equal to one line spacing.

5. Application design: font - Times New Roman, size - 12, line spacing - single.

6. Each section of the course work (content, introduction, conclusion, keywords, bibliography, appendices), each chapter of the course work begins on a new page.

Paragraphs continue the text of the chapter without a page break.

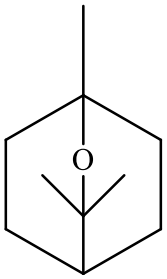
7. Fragments of normative legal documents: font - Times New Roman, size - 12, line spacing - 1.0.

8. Quotations, statistical or digital data used in the course work, borrowings from the works of other authors are formalized with links to the original source. Violation of this ethical and legal norm is plagiarism.

Links formatting: font - Times New Roman, size - 10, line spacing - single, alignment - in width.

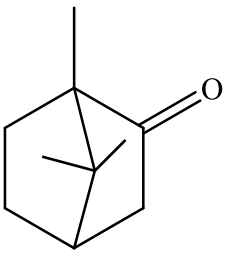
9. The text of the course work with the recall of the head of the course work and the report on the audit of the course work in the "Antiplagiat" system must be bound (bound) in a binder.
10. The course work and the documents attached to it (the opinion of the head of the course work, the report on the verification of the course work in the Antiplagiat system) are performed in one copy and submitted by the student to the department (to the Educational and Methodological Center of the Institute of Pharmacy). Course work is registered in a special journal indicating the date of admission and is certified by the student's signature.

EXAMPLE OF EXAM
Task 1
Determine the crushed and powdered raw materials by microscopic features (in the task 2 samples).
Task 2
Test (80 questions)
THIS COMPOUND IS CLASS



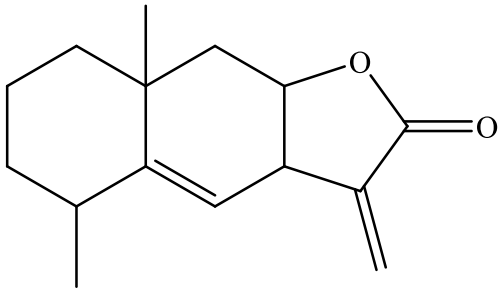
1) monocyclic monoterpenes
2) bicyclic monoterpenes
3) monocyclic sesquiterpenes
4) bicyclic sesquiterpenes
2. THIS COMPOUND IS CLASS

1) monocyclic monoterpenes



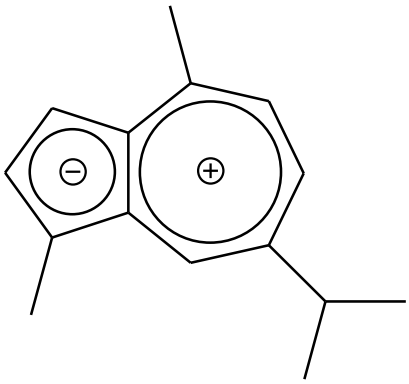
2) bicyclic monoterpenes
3) monocyclic sesquiterpenes
4) bicyclic sesquiterpenes

THIS COMPOUND IS CLASS



1) bicyclic monoterpenes
2) tricyclic monoterpenes
3) bicyclic sesquiterpenes
4) tricyclic sesquiterpenes

THIS COMPOUND



1) highly soluble in water
2) painted blue
3) has optical activity

5. THIS CONSTANT CHARACTERIZES THE QUALITY OF ESSENTIAL OILS

1) acid number
2) saponification number
3) iodine number
4) anisidine number

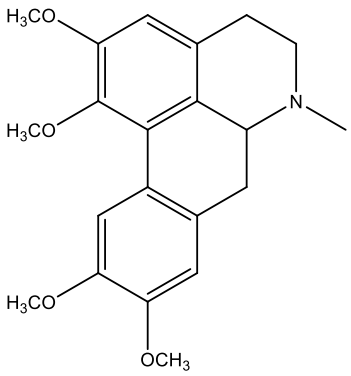
6. THE MAIN COMPONENTS OF THYME ESSENTIAL OIL - THYMOL AND CARVACROL CAN BE DETECTED ON TLC PLATES BY SPRAYING THEM WITH A SOLUTION

1) aluminum chloride
2) diazotized sodium sulfacyl
3) picric acid
4) sodium hydroxide

7. FOR THE QUANTITATIVE DETERMINATION OF FLAVONOIDS IN SAMPLES OF MEDICINAL HERBAL RAW MATERIALS SP XIV MOST OFTEN USES THE METHOD

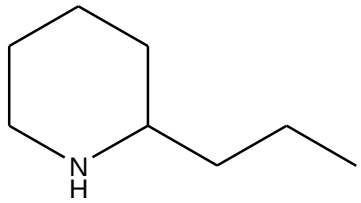
1) direct spectrophotometry
2) spectrophotometry after reaction with AlCl3 solution
3) HPLC
4) permanganatometric titration

8. THIS COMPOUND CAN BE DETECTED BY THE FORMATION OF A SEDIMENT WITH A SOLUTION



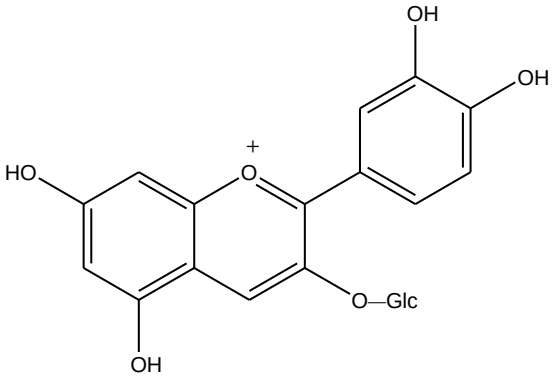
1) NaOH
2) $AlCl_3$
3) K_2BiI_4
4) $(CH_3COO)_2Mg$

9. THIS IS A CONNECTION



1) highly soluble in water
2) painted yellow
3) absorbs UV light
4) is liquid at room temperature

10. THIS CONNECTION IS CLASS



1) flavones
2) isoflavones
3) Halkons
4) anthocinidins

EVALUATION OF THE EXAM ANSWER
The first task is valued at 20 points.
There are 2 objects in the task. Each guessed object gives 10 points.

If the object is guessed with 1 attempt, 10 points are given.
If the object is guessed on the 2nd attempt, 8 points are given.
If the object is guessed on 3 attempts, 6 points are given.
If the object is not guessed on 3 attempts, 0 points are given.
The test gives 80 points
Total: 20 + 80 = 100.

BASICS OF BIOTECHNOLOGY

Teachers: Prof. Ruzaliya Tukhbatullina, Leysan Motygullina
Building, Department, classroom # Institute of Pharmacy, 414 room
Contact details:
Telephone number: 89172664566 (Ruzaliya Tukhbatullina), 89196270016 (Leysan Motygullina)
E-mail address: ruzaliya.tukhbatullina@kazangmu.ru, mleisi20@mail.ru.
Office and working hours: 402 (9-17)

Total hours — 180:
- Lectures 24 hours;
- Practical classes 80 hours;
- Independent work 40 hours;
- Control work 36 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=2856).__

Course objectives: The purpose of mastering the discipline
Students gain systematic knowledge about the basics of the biotechnological method of production of groups of drugs widely used in medicine, such as antibiotics, enzymes, vitamins, hormones and other medicinal and diagnostic products.
Tasks of the discipline:
formation of skills for the use of modern approaches to obtaining medicines, preventive and diagnostic drugs;

- the ability to solve specific problems in the field of technology for the production of biologically active compounds – products of the vital activity of microorganisms, cells and tissue cultures of plants and animals;
- formation of knowledge among specialists on handling, storage, transportation, and transfer of information to consumers about biotechnological preparations;
- formation of skills in the use of modern approaches to obtaining medicines, preventive and diagnostic drugs;
- based on previously acquired knowledge of the basics of molecular biology, to deepen knowledge on the production of drugs using methods of genetic engineering and engineering enzymology, on methods of quality control and authenticity of drugs obtained using biotechnology;
- formation of students, based on knowledge of the basics of microbiology, practical skills in the manufacture of biological products, assessment of the quality of raw materials, nutrient media;
- development of students' knowledge on the rules of organization of biotechnological production in accordance with the rules of the GMR, environmental safety requirements for the biological objects used;
- improvement of knowledge and skills of conducting methods of analysis of biologically active substances;
- to develop skills for the operation of bioreactors and knowledge on the management of technological parameters of the preparation process;
- formation of students' general cultural and professional competencies.

Course topics:

Calendar plan of lectures

1. Topic 1.1.Modern biotechnology in the creation and production of medicines.
2. Topic 1.1.Modern biotechnology in the creation and production of medicines.
3. Topic 1.2. Improvement of biological objects by methods of cellular and genetic engineering.
4. Topic 1.2. Improvement of biological objects by methods of cellular and genetic engineering.
5. Topic 1.2. Improvement of biological objects by methods of cellular and genetic engineering.
6. Topic 2.1. Components of biotechnological production of medicines.
7. Topic 2.1. Components of biotechnological production of medicines.
8. Topic 3.1. Biotechnology of recombinant proteins and gene therapy.
9. Topic 3.3. Biotechnology of enzymes. Engineering Enzymology.
10. Topic 3.4. Amino Acid Biotechnology.
11. Topic 4.1. Immunobiotechnology.
12. Topic 6.1. Genomics and its importance for the search for new drugs. Proteomics, its methods and significance for the search for new drugs.

Calendar plan of laboratory classes

1. Topic 1.1. Modern biotechnology in the creation and production of medicines.
2. Topic 1.2. Improvement of biological objects by methods of cellular and genetic engineering.

3. Topic 1.3. Preparation of nutrient media for the cultivation of biomass of medicinal plant tissues.
4. Topic 1.3. Preparation of nutrient media for the cultivation of biomass of medicinal plant tissues.
5. Topic 1.4. Technology of cultivation of medicinal plant tissues.
6. Topic 1.4. Technology of cultivation of medicinal plant tissues.
7. Topic 1.5. Colloquium I "General Biotechnology".
8. Topic 2.1. Components of biotechnological production of medicines.
9. Topic 2.1. Components of biotechnological production of medicines.
10. Topic 2.2. Culture fluids, processing, filtration. Isolation and purification of the target product.
11. Topic 2.3. Colloquium II "Organization of biotechnological production in industrial conditions. Bio-production equipment"
12. Topic 3.2. Antibiotics. Characteristic. The technology of obtaining antibiotics. Control of the fermentation process.
13. Topic 3.3. Biotechnology of enzymes. Engineering Enzymology.
14. Topic 3.3. Biotechnology of enzymes. Engineering Enzymology.
15. Topic 3.4. Amino Acid Biotechnology.
16. Topic 3.5. Biotechnology of vitamins.
17. Topic 3.6. Colloquium III "Private Biotechnology-2".
18. Topic 4.1. Immunobiotechnology.
19. Topic 5.1. Biotechnology of probiotics.
20. Topic 5.1. Biotechnology of probiotics.

The main literature:

1. Biotechnology Fifth edition / John E. Smith – University of Strathclyde, Cambridge University Press, 266 p.
2. Pharmaceutical Biotechnology, Drug Discovery and Clinical Applications. Edited by O. Kayser and R.H. Muller. ¨Copyright 2004 Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim.
3. Basics biotechnology. Processes and apparatus in biotechnology. Stages: isolation, separation, concentration and purification of target products : teaching aid for students in specialty 33.05.01 Pharmacy / Kazan State Medical University Ministry of health of the Russian Federation, Institute of Pharmacy ; compiled Tukhbatullina R. G. – Kazan : KSMU, 2024. – 43 p.
4. Basics biotechnology. Processes and apparatus in biotechnology. Biotech stage of industrial cultivation : teaching aid for students in specialty 33.05.01 Pharmacy / Kazan State Medical University Ministry of health of the Russian Federation, Institute of Pharmacy ; compiled Tukhbatullina R. G. – Kazan : KSMU, 2024. – 43 p.
5. Basics biotechnology. Processes and apparatus in biotechnology. Preparatory stage of biotechnological production : educational and methodical manual for students in specialty 33.05.01 Pharmacy / Kazan State Medical University Ministry of health of the Russian Federation, Institute of Pharmacy ; compiled Tukhbatullina R. G. – Kazan : KSMU, 2024. – 43 p.
6. Basics of biotechnology: educational and methodological tutorial for

7. foreign students of the specialty 33.05.01 ‘Pharmacy’ / Kazan State Medical
8. University of the Ministry of Health of Russian Federation; compilers:
9. Tukhbatullina R.G., Elizarova E.S. / - Kazan: KSMU, 2022. – 36 p

Additional literature:

1. Biopharmaceuticals biochemistry and biotechnology. Second edition / Gary Walsh – Industrial Biochemistry Programme CES Department University of Limerick, Ireland – 572 p.

Evaluation and grading:

Test

Test estimation criteria:

90-100% - "excellent" mark

80-89% - "good" mark

70-79% - "satisfactory" mark

Less than 70% of correct answers - the mark "unsatisfactory".

Interview

Interview or survey estimation criteria:

"Excellent" (10 points) is given for knowledge, when student discovers the assimilation of the entire volume of the program material, highlights the main provisions in the studied material, does not make mistakes in retelling the studied material and does not find it difficult to answer not ordinary questions.

"Excellent" (9 points) is given for knowledge, when student knows all the material studied, does not make serious mistakes, easily eliminates individual inaccuracies with the help of additional questions, and answers the teacher's questions without much difficulty.

“Good” (8 points) is given for knowledge, when the student knows the whole studied material well, answers on the teacher’s questions, as a rule, without much difficulty, but allows some inaccuracies and difficulties in answering the teacher’s questions.

“Satisfactory” (7 points) is given for knowledge, when student discovers mastering the basic material, but has difficulty in retelling it independently and requires additional questions from the teacher, prefers to answer questions and has difficulty in answering not ordinary questions.

"Unsatisfactory" (6 points or less) is given, when the student has fragmentary ideas about the studied material and most of the material is not mastered, or for the student's complete ignorance of the material studied.

Situational task

Criteria for estimating the solution of a situational task:

"Excellent" (90-100 points) - the answer for the situational task is correct, scientifically argued, with links to the topics studied.

"Good" (80-89 points) - the answer for the situational task is correct, scientifically argued, but without references to the topics studied.

"Satisfactory" (70-79 points) - the answer for the situational task is correct, but not argued, or the answer is incorrect, but an attempt is made to substantiate it from alternative scientific positions studied in the course.

"Unsatisfactory" (0-69 points) - the answer for the situational task is incorrect and not well argued.

Report with presentation
Criteria for estimating:
- novelty of the text (25 points)
- substantiation of the choice of source (25 points)
- the degree of depth of the essence of the issue of the topic (25 points)
- compliance with the requirements for the writing a report (25 points)
- compliance with the requirements for the content of the report.

90-100% - "excellent" mark (9-10 points) - all the requirements for writing a report followed.

80-89% - "good" mark (8 points) - the main requirements for the abstract are followed, there are shortcomings in the presentation of the material: there is no logic of presentation and consistency, the volume of the abstract does not correspond, there are shortcomings in the design.

70-79% - "satisfactory" mark (7 points) - there are deviations from the requirements for the report, the topic is partially revealed, mistakes were made in the content of the report.

Less than 70% - "unsatisfactory" mark (6 points) - the topic of the report is not revealed, a significant misunderstanding of the problem is found.

The originality of the text must be at least 80%.

Laboratory work
Criteria for assessing the implementation of practical work and the mastering of practical skills:
Independence is assessed in the implementation of practical work, the activity of work in the classroom, the correctness of the tasks, the level of preparation for classes and the possession of practical skills. The algorithm for implementation practical work is described in the distance course of the educational portal, the results and conclusions are recorded in the workbook.
Description of the scale for assessing the implementation of practical work and the development of practical skills:
"Passed" - the student knows the procedure for performing practical work, shows the assimilation of the studied material, the ability to fully apply the skills of the technique of chemical experiments, conducting testtube reactions, skills in working with chemical glassware and instruments; receives the correct reliable data as a result of the work performed.
“Not passed” - has no idea about the order of performing practical work, there are fragmentary ideas about the studied material and most of the material is not mastered, or the student’s complete ignorance of the material passed, is not able to fully apply the skills of chemical experiments, conducting test tube reactions, skills of working with chemical utensils and appliances; Cannot get the correct reliable data as a result of the work.
Extracurricular performance of independent work
The distance course has tasks for independent work of students during extracurricular time.
"Passed" - the student completed all tasks in full.
"Not passed" - the student did not complete the tasks at all or did not complete them in full, with gross errors.
Intermediate certification - an exam that can be held in writing or in the form of an interview orally using tickets.

<u>Classroom rules:</u>

- Be respectful

- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of Colloquium I "General Biotechnology"

Ticket:

What is the essence of biotechnology? What is it aimed at? What are the advantages of biotechnological processes?

Give the classification of nutrient media. What components of the medium are most important for cell formation and nutrition?

Test:

Choose one or more correct answers:

1. Who introduced the term "biological object'?

Alexander Fleming

Francis Crick J

Louis Pasteur

Paul Berg

2. What was discovered by Alexander Fleming?

Penicillin

Streptomycin

Somatotropin

Glycerol

3. What was happening in genotechnical period of biotechnology?

Production of antibiotics was opened

Louis Pasteur discovered microorganisms

Controlled fermentation was carried out.

Cell and genetic engineering was explored

Example of Colloquium II "Organization of biotechnological production in industrial conditions. Bio-production equipment"

Ticket:

What is a biotechnology system? How many steps does it contain? What is their essence?

In the fourth stage of isolation of the target product methods of chromatography, dialysis and crystallization are used. Explain these methods. What is the difference between them?

Test:

1) Dialysis is a process:

is based on the different solubility of substances at different temperatures

in which low molecular weight substances can pass through a semi-permeable septum, while high molecular weight substances remain

of transfering of a product dissolved in a liquid into a solid phase by its precipitation on special solid carriers.
of isolation of the target product by adding a reagent to the liquid, which interacts with the dissolved product and converts it into a solid phase.
2) Centrifugation is a process of:
sedimentation of particles suspended in a liquid using centrifugal force
destruction of cell membranes under the action of chemicals and temperature
destruction of cell membranes under the action of enzymes at elevated temperatures
collecting solutes on a solid sorbent, but not one, but several, often close in structure
3) Operations, which are carried out in the automatic chamber filter program:
washing
removing the sediment
filtration
pressing

Example of Colloquium III "Private Biotechnology-2"
Ticket:
Classification and properties of enzymes as biological catalysts
Microbiological synthesis of amino acids. Producers of amino acids. General principles of designing amino acid producers.
Vitamins B2. The main producers.Scheme of biosynthesis and ways of intensification of the process.
Test:
METHODS FOR OBTAINING AMINO ACIDS:
chemical synthesis followed by enzymatic separation of racemates
microbiological synthesis
c. chemico-enzymatic synthesis
d. enzymatic synthesis
e. hydrolysis of protein compounds
2. PRIMARY CELL METABOLITES:
a.organic acids
b. amino acids
c. vitamins
d. coenzymes
e. antibiotics
f. enzymes

Examination ticket number 1
1. Biotechnology as a science and a sphere of production. A brief history of the development of biotechnology. The relationship of biotechnology to fundamental disciplines. (25p.)
2. Recombinant producers of biologically active substances. Transgenic plants and animals. (25p.)
3. Bioconversion (biotransformation) as a method of obtaining biologically active substances. Enzyme preparations as biocatalysts in the pharmaceutical industry. (25p.)
4. Name the equipment, purpose, principle of operation (25p.)

Estimation criteria of exam:
The examination in the discipline " Basics of biotechnology" is conducted in writing.
3 astronomical hours of time are provided for writing written answers. The answers should be set out in detail within the framework of the indicated questions. After the allotted time, the work is handed over to the teacher.

The ticket structure includes 4 questions, 3 of them theoretical and 1 question in the form of a situational problem. Each question is rated at 25 points with a complete presentation of the answers to the questions posed, which is equivalent to 100%.
<17 points-unsatisfactory (less than 70%)
18-19 points-satisfactory (70%)
20-22 points-good (80%)
23-25 points-excellent (90-100%)

LEGAL BASIS OF THE PHARMACIST'S ACTIVITY

Teachers: Leysan Motygullina
Building, Department, classroom # Institute of Pharmacy, educational pharmacy, room 306, lecture hall 2
Contact details:
Telephone number: 89196270016 (Leysan Motygullina)
E-mail address: mleisi20@mail.ru
Office and working hours: 402 (9-17)

Total hours — 72:
- Lectures 10 hours;
- Practical classes 30 hours;
- Independent work 32 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=2985).

Course objectives: The purpose of mastering the discipline
The purpose and objectives of mastering the Legal basis of the pharmacist's activity discipline are to provide students with systematic, theoretical and applied knowledge about the essence, methods, means, principles of the regulatory framework governing the circulation of

drugs, as well as in preparing students to implement the tasks of professional activity on the principles of law.

Tasks of the discipline:

- acquisition of theoretical knowledge about the modern legal foundations of pharmacists' activities in the organization of the work of a pharmaceutical enterprise;
- formation of skills and competencies for the use of modern legal foundations of pharmaceutical activity in the organization of the work of a pharmaceutical enterprise;
- to form a system of knowledge in the field of legal relations;
- to develop the skills of analyzing problematic situations as part of the legal system, and identifying its components and the relationship between them;
- to form skills of conflict resolution and contradictions in business communication based on consideration of the interests of all parties and the norms of the current legislation;
- to form the willingness and ability to choose the style of communication with partners, based on the norms of legislation in the field of drug treatment.

Course topics:

Calendar plan of lectures

2. Topic 1.1.Organizational and legal forms of enterprises: features, differences, examples for pharmaceutical enterprises
3. Topic 1.1.Organizational and legal forms of enterprises: features, differences, examples for pharmaceutical enterprises
4. Topic 2.1.The structure of patent law. Trademarks and service marks in pharmacy.
5. Topic 2.1.The structure of patent law. Trademarks and service marks in pharmacy.
6. Topic 3.1.The concept of labor relations. Registration of employment. Employment contract: General provisions of the employment contract. The order of conclusion, modification, termination.

Calendar plan of practical classes

1. Topic 1.1.Organizational and legal forms of enterprises: features, differences, examples for pharmaceutical enterprises.
2. Topic 1.1.Organizational and legal forms of enterprises: features, differences, examples for pharmaceutical enterprises
3. Topic 1.2. The concept of offenses and legal liability of a legal entity and an individual. Licensing system in the field of drug circulation.
4. Topic 1.2. The concept of offenses and legal liability of a legal entity and an individual. Licensing system in the field of drug circulation.
5. Topic 1.3.Regulatory and legal regulation of the circulation of narcotic and psychotropic drugs. The procedure for licensing activities related to the trafficking of narcotic drugs, psychotropic substances and their precursors, and the cultivation of narcotic plants. Knowledge of the articles of the document.
6. Topic 1.3.Regulatory and legal regulation of the circulation of narcotic and psychotropic drugs. The procedure for licensing activities related to the trafficking of narcotic drugs, psychotropic substances and their precursors, and the cultivation of narcotic plants. Knowledge of the articles of the document.
7. Topic 2.1.The structure of patent law. Trademarks and service marks in pharmacy.
8. Topic 2.2.Patent right for inventions, utility models and industrial designs in pharmacy.

9. Topic 2.2.Patent right for inventions, utility models and industrial designs in pharmacy.
10. Topic 3.1.The concept of labor relations. Registration of employment. Employment contract: General provisions of the employment contract. The order of conclusion, modification, termination.
11. Topic 3.1.The concept of labor relations. Registration of employment. Employment contract: General provisions of the employment contract. The order of conclusion, modification, termination.
12. Topic 3.2.Rights and obligations of pharmaceutical workers. Qualification requirements for pharmaceutical specialists.
13. Topic 3.2.Rights and obligations of pharmaceutical workers. Qualification requirements for pharmaceutical specialists.
14. Topic 3.3.The concept of financial responsibility, types, order of conclusion.
15. Topic 3.3.The concept of financial responsibility, types, order of conclusion.

The main literature:

1. Vnukova V.A. Legal foundations of pharmaceutical activity / Vnukova V.A., Spichak I.V. – Moscow: GEOTAR-Media, 2020. – 432 p.
2. Legal basis of the pharmacist`s activity : manual for foreign students of the Institute of Pharmacy with teaching in English in the specialty «Pharmacy» / Medical University Ministry of Health of the Russian Federation, Institute of Pharmacy ; complier: Tukhbatullina P. G., Motygullina L. I. – Kazan : KSMU, 2022. – 23 p.

Additional literature:

1. Management and economics of pharmacy: textbook / E.A. Maksimkina et al.; edited by N. V.L. Bagirov. – M.: Medicine, 2004. – 716 p.

Evaluation and grading:

Practical exercises. The following types of current control are used in practical classes:

1. Testing is a tool by which a teacher evaluates the degree to which a student has achieved the required knowledge, skills, and abilities. The preparation of the test includes the creation of a verified system of questions, the actual procedure for testing and the method of measuring the results obtained. The test consists of tasks with a choice of one answer out of five suggested. The type of tasks is closed, the number of tasks in the test ticket is 10, the number of test ticket options is 3, for a correct answer – 1 point, for an incorrect or unspecified answer – 0 points.

Description of the scale of assessment of testing in a practical lesson:

- 9-10 points are awarded if the student correctly answered 90% of the test questions.
- 8 points are awarded if the student correctly answered from 80% to 90% of the test questions.
- Less than 7 points – awarded if the student correctly answered less than 69% of the test questions

2. Evaluation of oral communication in a practical lesson.

The activity of work in the classroom, the level of preparation for classes is evaluated.

Description of the assessment scale

-9-10 points are awarded if the student has revealed more than 90% of the content of the question of the topic of the lesson.

- 8 points are awarded if the student has correctly disclosed from 80% to 90% of the questions of the lesson topic.
- Less than 7 points are awarded if the student has correctly disclosed less than 69% of the questions of the lesson topic.
3. Assessment of skills and abilities in solving situational problems in a practical lesson. The independence and correctness of practical tasks are evaluated.
Description of the assessment scale
- 9-10 points are awarded if the student has correctly completed more than 90% of practical tasks.
- 8 points are awarded if the student has correctly completed from 80% to 90% of practical tasks.
- Less than 7 points are awarded if the student has correctly completed less than 69% of practical tasks.
Overall student rating is build up from class attendance, test results and midterm assessment results.
Intermediate certification in the discipline: credit
Evaluation criteria:
up to 69 – "unsatisfactory"
70-79 – "satisfactory"
80-89 – "good"
90-100 – "excellent"

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Level I – assessment of knowledge
1. Tests
Example:
1. The patent holder may be:
- only the author
- only legal entities
- author, employer, their legal successors
- any interested person
2. The application for a utility model includes everything except:
- statement
- results of the formal examination
- drawings
- description
Evaluation criteria: the score on the test is set in proportion to the proportion of correct answers.
90-100% – the score is "excellent";

80-89% – rating "good";
70-79% – rating "satisfactory".
Less than 70% of correct answers – rating "unsatisfactory".
2. Interview

Examples of tasks:
1. The structure of intellectual property. Classification of intellectual property objects by spheres of human activity.
2. Trademark as part of the Institute of intellectual property.
3. Examples of trademarks and service marks in pharmacy.
4. Intellectual property of scientific, technical and industrial spheres.
5. Grounds stages of registration and liquidation of a pharmaceutical company.
Evaluation criteria:
"Excellent" (90-100 points) – the oral message answers the question in full, the correct interpretation of the terms is given, the key questions are considered.
"Good" (80-89 points) – the oral message answers the question in full, the correct interpretation of the terms is given, the key issues of the topic are partially considered.
"Satisfactory" (70-79 points) – the oral message answers the question, but not in full, the correct interpretation of the terms is given, the key issues of the topic are partially considered.
"Unsatisfactory" (0-69 points) – the oral message does not answer the question, the terms are misinterpreted, the key issues of the topic are not touched upon.

Level II – assessment of skills
Situational task. The unitary enterprise was deprived of its license by the Regional Department of Health due to the fact that it produced medicines in violation of the established requirements. But, despite the
cancellation of the license, the company continued its pharmaceutical activities. Therefore, the prosecutor appealed to the arbitration court with a claim for the liquidation of this enterprise, since it carried out
pharmaceutical activities after the cancellation of the license.
Question: What are the actions of the court? What normative legal documents should the court be guided by?
Answer: The court granted the liquidation claim. At the same time, the court was guided by the norms of Article 61 of the Civil Code of the Russian Federation, on the basis of which a legal entity can be liquidated in case of carrying out activities without a proper permit (license). At the same time, the court pointed out that in cases where a legal entity carries out several types of activities, the deprivation of its license to conduct any one type of activity cannot be considered as a basis for its liquidation if, after the cancellation of the license, it has stopped this type of activity and does not allow repeated or gross violations of the law.
Evaluation criteria:
"Excellent" (90-100 points) – the use of an adequate example, references to the knowledge gained in the course, a scientific explanation of your point of view.
"Good" (80-89 points) – using an adequate example, without references to the knowledge gained in the course, a scientific explanation of your point of view.

"Satisfactory" (70-79 points) – using a little relevant example, without references to the knowledge gained in the course, a scientific explanation of one's point of view.
"Unsatisfactory" (0-69 points) – using an inadequate example, without references to the knowledge gained in the course and without a scientific explanation of the point of view

Level III – assessment of skills
The following types of control are used to evaluate learning outcomes in the form of skills:
- solving situational problems.
Situational task.
When checking a private pharmacy organization by inspectors of the tax authority, it was revealed that the owner of the organization had received a certificate of registration, but had not received a license for
pharmaceutical activity or was at the receiving stage.
Question: What kind of punishment will he receive?
Answer: Engaging in pharmaceutical activity by a person who does not have a license for this type of activity entails the imposition of an administrative fine in the amount of two thousand to two thousand five hundred rubles (Article 6.2 of the Administrative Code of the Russian Federation).
Evaluation criteria:
"Excellent" (90-100 points) – the answer is correct, scientifically reasoned, with links to the topics covered.
"Good" (80-89 points) – the answer is correct, scientifically reasoned, but without references to the topics covered.
"Satisfactory" (70-79 points) – the answer is correct, but not scientifically reasoned, or the answer is incorrect, but an attempt is presented to justify it from alternative scientific positions passed in the
course.
"Unsatisfactory" (0-69 points) – the answer is incorrect and not scientifically reasoned

MEDICINES FROM NATURAL RAW MATERIALS

Teachers: Ass.Prof. Svetlana Kamaeva
Building, Department, classroom: Amirkhana, 16, Department of Pharmaceutical Technology, 408, 404

Contact details:
Telephone number: 89600801619 (Kamaeva Svetlana)
E-mail address: farm64@bk.ru
Office and working hours: 409 (8-18)

Class hours: **108 hours**
Total 108 hours.
Course: 4

Term (Semester): 7
Lectures 18 hours.
Practical exercises 45 hours.
Independent work 45 hours.
FINAL CREDIT
Credit units of labor (ZET) 3

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Laboratory practical classes and training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher. Also they contain experimental scientific research activities. It requires the use of special equipment, facilities and materials in classroom. This kind of training to be held in teaching laboratories.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=2960).
Course objectives:
Main goal of mastering the discipline is the formation of systemic knowledge, skills in the development and manufacture of medicines and drugs in various dosage forms, as well as the organization of pharmaceutical production, pharmacies, small, medium and large enterprises.
This subject based on Pharmaceutical technology studies state regulation of the production of medicines from natural raw materials of herbal and animal origin, various dosage forms, phytopreparations, general principles of organizing the production of finished medicines; standardization of medicinal products of natural origin according to GMP requirements; organization of the development and improvement of technologies for the production of various dosage forms from natural raw materials in the conditions of industrial production, sterile and aseptically manufactured dosage forms, phytopreparations, non-traditional dosage forms. Pharmaceutical technology implements is the interconnection of various stages of development and regularities of a general and particular nature in obtaining medicines: therapeutic, prophylactic, rehabilitation, diagnostic, homeopathic, veterinary and cosmetic preparations. Pharmaceutical technology regulates the quality assurance of medicines taking into account the current legislative documents.
This subject “MEDICINES FROM NATURAL RAW MATERIALS” studies the production of solid, liquid and soft dosage forms, sterile and aseptically manufactured dosage forms from herbal and animal raw material, their technology under conditions of pharmaceutical factory and in bigger production conditions.

Tasks of the discipline:
The challenges of MEDICINES FROM NATURAL RAW MATERIALS technology as specialized academic disciplines are:

teaching students the activities of a pharmacist based on the study of the theoretical laws of the processes for obtaining and converting drugs and excipients from herbal and animal raw material into dosage forms;
the formation of students' practical knowledge, skills and abilities of manufacturing medicines from herbal and animal raw material, as well as assessing the quality of raw materials, intermediates and finished medicines;
developing students' ability to choose the most effective and rational medicines and therapeutic systems based on the modern biopharmaceutical concept adopted in world practice, as well as on the development of the technology of selected dosage forms from herbal and animal raw material and standardizing documentation for them.

Course topics: VII term
Calendar plan of lectures
1 Dosage forms from plant raw materials. Ethyl alcohol as a solvent and extractant. Dilution and strengthening of alcohol solutions. Determination of the concentration of alcohol solutions. Mass transfer processes. Classification of Phytoextraction preparations. Theoretical Foundations of Extraction of Capillary-Porous Raw Materials. Factors affecting on the completeness and speed of extraction of biologically active substances. Extraction methods. Classification. Characteristic. Process of intensification of methods. Equipment for Extraction
2 Tinctures. Obtaining tinctures by maceration, percolation and intermittent percolation. Processes and devices. Methods for cleaning extracts. Settling. Filtration. Centrifugation. mass transfer processes. Equipment. Standardization of tinctures. Alcohol recovery. Material balance for absolute alcohol and active substances.
3 Liquid extracts: methods of preparation and purification. thick and dry extracts. Methods for obtaining and cleaning. Processes and devices. Thermal processes. Heat carriers. The use of water vapor as a heat carrier. Heat exchangers. Evaporation. Types of vacuum - evaporators and installations. Side effects of evaporation. Drying. Statics and kinetics of drying. Dryers of convective, contact action, etc. Equipment. Standardization of tinctures and extracts. Oil extracts. Extracts-concentrates.
4 Syrups, fragrant waters. Theoretical foundations of distillation of essential oils. Equipment. Technological schemes of production. Potions with fragrant waters and syrups.
5 Aqueous extracts from medicinal plant materials. Characteristic. Classification. Use of the main provisions of the theory of the extraction process in obtaining aqueous extracts. Technology of infusions and decoctions depending on the content of active substances in raw materials. Medicines containing galenic preparations and aqueous extracts made from medicinal plant materials and concentrate extracts.
6 Aqueous extracts from medicinal plant materials. Characteristic. Classification. Use of the main provisions of the theory of the extraction process in obtaining aqueous extracts. Technology of infusions and decoctions depending on the content of active substances in raw materials. Medicines containing galenical preparations and aqueous extracts made from medicinal plant materials and concentrate extracts.
7 Maximum purified phytopreparations: methods of obtaining and purification. General technological scheme. Private technology. Standardization of the most purified drugs. Phytopreparations of individual substances. General technological scheme. Private technology. Preparations of biogenic stimulants. Preparations from fresh plant materials.

8 Preparations from animal raw materials: methods of production and purification. Private technology. Storage conditions and methods of preservation of organs and tissues. Technological scheme for obtaining preparations of dried glands and tissues. Dosage forms and standardization. Features of the technology of extraction preparations for internal use. Technological scheme for obtaining drugs for parenteral administration. Highly efficient purification methods: gel filtration, ion exchange, affinity chromatography, etc. Insulin preparations (genetically engineered, porcine, beef). Classification of drugs by duration of action (short, medium and long). extension methods. Highly purified insulin preparations. Insulin "M" and "MS". standardization of insulin. Release form. Automatic dispensers insulin. Private technology. Enzyme preparations. General characteristics: definition, specifics of enzymatic reactions. Classification and nomenclature of enzymes. Enzyme preparations of plant and animal origin. immobilized enzymes. Methods of immobilization. Water-soluble preparations of immobilized enzymes. Incorporation of enzymes into microcapsules. Incorporation of enzymes into liposomes. Preparations of immobilized enzymes used in local diseases. Standardization of enzyme preparations. Methods for assessing enzymatic activity. Private technology.

Calendar plan of laboratory classes

1 Dosage forms based on plant raw materials. Main processes and equipment of pharmaceutical technology in the production of herbal medicines. Ethyl alcohol as a solvent and extractant. Dilution and strengthening of alcohol solutions. Determination of the concentration of alcohol solutions. mass transfer processes. Classification. Phytoextraction preparations. Theoretical foundations for the extraction of capillary-porous raw materials. Factors affecting the completeness and speed of BAS extraction. Extraction methods. Classification. Characteristic. Process intensification methods. Equipment for extraction.

2 Tinctures. Obtaining tinctures by maceration, percolation, intermittent percolation. Processes and devices. Methods for cleaning extracts. Settling. Filtration. Centrifugation. mass transfer processes. Equipment. Standardization of tinctures. Alcohol recovery. Material balance for absolute alcohol and active substances.

3 Liquid extracts: methods of preparation and purification. The extracts are thick and dry. Methods for obtaining and cleaning. Processes and devices. Thermal processes. Heat carriers. The use of water vapor as a heat carrier. Heat exchangers. Evaporation. Types of vacuum evaporators and installations. Side effects of evaporation. Drying. Statics and kinetics of drying. Dryers are convective, contact, etc. Equipment. Standardization of tinctures and extracts. Oil extracts.

4 Syrups, fragrant waters. Theoretical foundations of distillation of essential oils. Equipment. Technological schemes of production. Potions with fragrant waters, herbal preparations and syrups.

5 Aqueous extracts from medicinal plant materials. Characteristic. Classification. Use of the main provisions of the theory of the extraction process in obtaining aqueous extracts. Technology of infusions and decoctions depending on the content of active substances in raw materials. Medicines containing galenic preparations and aqueous extracts made from medicinal plant materials and concentrate extracts.

6 Control work

7 Maximum purified phytopreparations: methods of obtaining and purification. General technological scheme. Private technology. Standardization of the most purified drugs. Phytopreparations of individual substances. General technological scheme. Private technology. Preparations of biogenic stimulants. Preparations from fresh plant materials.

8 Preparations from animal raw materials: methods of production and purification. Private technology. Storage conditions and methods of preservation of organs and tissues. Technological scheme for obtaining dried preparations glands and fabrics. Medicinal forms and standardization. Peculiarities of technology extraction preparations for internal use. Technological scheme of obtaining drugs for parenteral administration. High performance purification methods: gel filtration, ion exchange, affinity chromatography, etc. Insulin preparations (genetically engineered, pork, beef). Classification of drugs by duration of action (short, medium and long). extension methods. Highly purified insulin preparations. Insulin "M" and "MS". Standardization insulin. The form release. Automatic dispensers insulin. Private technology. Enzymatic drugs. General characteristics: definition, specifics of enzymatic reactions. Classification and nomenclature of enzymes. Enzyme preparations of plant and animal origin. immobilized enzymes. Methods of immobilization. Water-soluble preparations of immobilized enzymes. Incorporation of enzymes into microcapsules. Incorporation of enzymes into liposomes. Preparations of immobilized enzymes used at local diseases. Standardization of enzyme preparations. Methods for assessing enzymatic activity. Private technology.

9. Final credit : test, module 2.

Text books and required supplies:

1.Pharmaceutical technology. Technology of dosage forms : a textbook for students of higher educational institutions / I. I. Krasnyuk, S. A. Valevko, T. V. Mikhailova [et al.] ; ed. I. I. Krasnyuk, G. V. Mikhailova. – 3rd ed., revised and additional – Moscow : Publishing center «Academy», 2007. – 592 p.

List of additional literature

1. Pharmaceutical technology. Technology of dosage forms : hands. to pract. Occupations : textbook. allowance / I. M. Krasnyuk [et al.]. – Moscow : GEOTAR-Media, 2012. – 544 p.
2. Federal Law «On the Circulation of Medicines» dated 12.04.2010 N 61-FZ.
3. Order of the Ministry of Health of the Russian Federation of 2023 No. 249n «On approval of the rules for the manufacture and dispensing of drugs for medical use by pharmacy organizations, individual entrepreneurs licensed for pharmaceutical activity».

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”.

Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of module No. 1.

Ticket 1

1.How much raw material and extractant should be taken to obtain 200 L liquid extract of Valerianae? Select a method of obtaining and describe the technology.

2.How much raw material and extractant should be taken to obtain 300 L liquid Cortex Frangulae? Choose a production method and describe the technology.

3. Recipe: Infusi rhizomata cum radicibus Valerianae ex 8,0- 100,0

Novocaini	0,6
Kalii bromidi	1,0
Glucosi	6,0
Tincturae Leonuri	10,0

Misce. Da. Signa. By 1 tablespoon 2 times a day

EVALUATION OF THE MODULE ANSWER

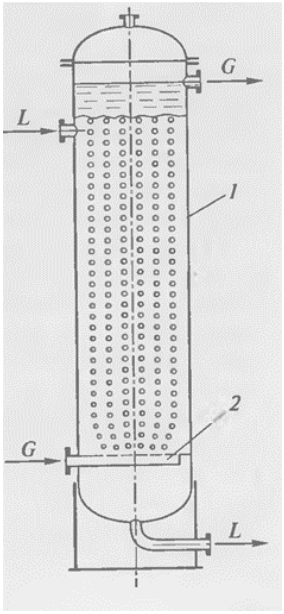
On each lesson students have the mark for work. In Module 1 5 classes

Total for classes 5x10= 50 points

Test on Portal 20 20 points

On Module 1 students have 3 theoretical questions, each task is evaluated by 10 points.
Total: 3 x 10 = 30 points
Total for Module 1 100 points

Example of module No. 2



1.Calculate the consumption rates of raw materials and extractant to obtain 250 l of valerian tincture (Kabsoption=1.5). Make a material balance for absolute alcohol, provided that the technological process resulted in 245 l of finished product with an alcohol content of 68% and 55 l of recuperate containing 6% alcohol. Calculate technical and economic indicators.

2. Recipe: Analgini 0.5
Glucosi 5.0
Magnesii sulfatis 2.0
Tincturae Convallariae 3.0
Aquae purificatae 100.0
Misce. Da. Signa. 1 tablespoon 3 times a day orally

EVALUATION OF THE MODULE ANSWER
On Module 2 students have in classroom 50 tests on Educational portal – 50 points.
On Module 2 students have 5 theoretical questions, each task is evaluated by 10 points.
Total for Module 2 100 points
For all positive results will be FINAL CREDIT in recordbook.

MANAGEMENT AND ECONOMICS OF PHARMACY

Teachers: Assistant of Institute of Pharmacy Elizaveta Voronina,
assistant of Institute of Pharmacy Julia Sprenger

Building, Department, classroom Institute of Pharmacy, 313, 303, 305, 306

Contact details:
Telephone number: 89534827054 (ass. Julia Sprenger)
E-mail address: juliasprenger@yandex.ru

Total hours: 576 h
Lectures – 84 hours;
Practical classes – 248 hours;
Independent work – 208 hours;
Control – 36 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (http://www.kgmu.kcn.ru:40404/moodle/login/ index.php).
Coursework is a scientific research that a student conducts independently on a chosen topic. The work is done in writing, where the student searches for an answer to a current question on the topic of the research. The coursework is written at the end of studying a specialized discipline and should demonstrate the results of the educational process, theoretical knowledge and the results of the student's practice.

The purpose and objectives of mastering the discipline:
The goals of mastering the discipline "Management and economics of pharmacy" is the formation of students' system knowledge, skills and abilities to provide qualified, timely, affordable, high-quality pharmaceutical care and to ensure the safety of the use of medicines.

Objectives:
1. Acquisition of theoretical knowledge on the organization of activities of pharmaceutical enterprises and the provision of medical assistance to the population.
2. Formation of skills and competence in the use of methods of organization and management of enterprises engaged in the field of medicine circulation.
3. Acquisition of skills and competencies for the implementation of activities related to the implementation of medicines in accordance with the requirements of the current legal and regulatory documentation.
4. Acquisition of skills and competencies in the organization of financial and economic activities in order to maximize profitability and increase the competitiveness of the pharmacy organization.

5. Formation of skills and competencies in the application of basic methods, methods and means of obtaining pharmaceutical information, its storage, processing, compliance with information security requirements.

Course topics:
3th course
5th semester
Calendar plan of lectures

2. Regulatory and legal regulation of pharmaceutical activity. Classification and structure of pharmacy organizations.
3. Organization of work of self-supporting pharmacy. Pharmaceutical ethics and deontology.
4. Main principles of organization of pharmacy's work for receiving prescriptions and dispensing medicines.
5. Organization of medicine provision for population within the framework of Federal and regional target programs.
6. Organization of subject-quantitative accounting in a pharmacy.
7. Organization of manufacturing of medicines in pharmacy.
8. Organization of medicine provision for inpatient patients.
9. Organization of activity of department of stocks. Organization of activity of pharmacy for laboratory and packaging works.
10. Organization of supply of pharmaceutical organizations with medicines and medical products.
11. Organization of supply of pharmaceutical organizations with medicines and medical products.
12. Control and authorization system.

Calendar plan of laboratory classes

1. Regulatory and legal regulation of pharmaceutical activity. Classification and structure of pharmacy organizations.
2. General principles of organization of work of self-supporting pharmacy.
3. Pharmaceutical ethics and deontology.
4. Organization of pharmacy's work for receiving prescriptions and dispensing medicines.
5. Organization of medicine provision for population within the framework of Federal and regional target programs.
6. Organization of subject-quantitative accounting in a pharmacy.
7. Organization of manufacturing of medicines in pharmacy.
8. Organization of medicine provision for inpatient patients.
9. Organization of activity of department of stocks.
10. Organization of activity of pharmacy for laboratory and packaging works.
11. Organization of supply of pharmaceutical organizations with medicines and medical products.
12. Control and authorization system. Certification of quality of medicines and pharmaceutical products.
13. Control and authorization system.Licensing of pharmaceutical activity

14. Control work №1.

6th semester

Calendar plan of lectures

1. Economic analysis of pharmacy's financial and economic activities.
2. Planning pharmacy's number of prescriptions and trade turnover.
3. Planning pharmacy's stocks of goods.
4. Analysis and planning pharmacy's current assets.
5. Planning receipt of goods to a pharmacy.
6. Analysis and planning of pharmacy's expenses. Ways to minimize expenses.
7. Structure of pharmacy's income, analysis and planning. Profit planning.
8. Basics of bank crediting.
9. Business plan for a pharmacy to be opened for the first time.
10. Accounting of trade overlays. Pricing of pharmaceutical products.
11. Taxation of pharmacy organization.

Calendar plan of laboratory classes

1. Economic analysis of pharmacy's financial and economic activities.
2. Planning pharmacy's number of prescriptions and trade turnover.
3. Planning pharmacy's stocks of goods.
4. Analysis and planning pharmacy's current assets.
5. Planning receipt of goods to a pharmacy.
6. Analysis and planning of pharmacy's expenses. Ways to minimize expenses.
7. Structure of pharmacy's income, analysis and planning. Profit planning.
8. Basics of bank crediting.
9. Business plan for a pharmacy to be opened for the first time.
10. Accounting of trade overlays. Pricing of pharmaceutical products.
11. Taxation of pharmacy organization.
12. Control work № 2.

4th course

7th semester

Calendar plan of lectures

1. Accounting for receipt of goods in a pharmacy.
2. Accounting for sales and other expenses of goods in a pharmacy.
3. Accounting for movement of auxiliary materials and building materials, containers, fixed assets.
4. Accounting for wage payments in pharmacy organizations.
5. Cash accounting in a pharmacy.
6. Monthly report of a pharmacy on financial and economic activities.
7. Inventory of commodity-material values in a pharmacy.
8. Balance accounting.

Calendar plan of laboratory classes

1. Accounting for receipt of goods in a pharmacy.
2. Accounting for sales and other expenses of goods in a pharmacy.
3. Accounting for movement of auxiliary materials and building materials, containers, fixed assets.
4. Accounting for wage payments in pharmacy organizations.
5. Cash accounting in a pharmacy.
6. Monthly report of a pharmacy on financial and economic activities.
7. Inventory of commodity-material values in a pharmacy.
8. Balance accounting.
9. Control work № 3.

8th semester

Calendar plan of lectures

1. Fundamentals of pharmaceutical management.
2. Leadership styles, management methods.
3. Forms of power used in pharmacy organizations.
4. Personnel management.
5. Basics of office work in a pharmaceutical organization.
6. Conflict management in organization.
7. Decision-making process.
8. Motivation in the pharmacy bussiness.
9. Psychology of managing a pharmaceutical organization.

Calendar plan of laboratory classes

1. Fundamentals of pharmaceutical management.
2. Leadership styles, management methods.
3. Forms of power used in pharmacy organizations.
4. Personnel management.
5. Basics of office work in a pharmaceutical organization.
6. Conflict management in organization.
7. Decision-making process.
8. Motivation in the pharmacy bussiness.
9. Psychology of managing a pharmaceutical organization.
10. Modeling of interpersonal communications.
11. Control work №4.
12. Exam.

Text books and required supplies:

Basic literature:

1. Upravlenie i ekonomika farmacii: uchebnik V.L. Bagirova, E.A.Maksimkina, R.T. Glembockaya, P.V. Lopatina i dr.; Pod red. V.L. Bagirovoj. – M.: «Medicina», - 2004., - 720 s.
2. Upravlenie i ekonomika farmacii: Uchebnik v dvuh tomah / A.A. Teodorovich, E.E. Loskutova, E.A. Maksimkina i dr., pod re. E.E. Loskutovoj. – M.: «Akademiya», - 2004., - 447 s.

3. Krikov V.I., Prokopishin V.I. «Organizaciya i ekonomika farmacii». – M.:Medicina, - 1991, - 623 s.
Additional literature:
1. Federal'nyj Zakon ot 06.12.2011 № 402-FZ «O buhgalterskom uchete»;
2. Lobuteva L.A., Lopatin P.V., Chekova L.P. «Organizaciya farmacevticheskoj pomoshchi: sistemnyj marketingovyj podhod (cikl lekcij). – M.: VUNMC MZ RF, - 174 s.

Evaluation and grading:
Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/ assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper).

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "unsatisfactory", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Standard control tasks or other materials necessary for the assessment
of knowledge, skills, and (or) experience of activities
that characterize the stages of competence formation
in the process of mastering the educational program

Level 1–assessment of knowledge
The following types of control are used to evaluate learning outcomes in the form of knowledge:
– test;
Examples of tasks:
1. The property belonging to the Russian Federation is called: a) municipal
b) state
c) private
d) mixed
e) property of public organizations
2. Does not apply to subsystems of pharmaceutical care:

a) control and supervision of pharmaceutical activities b) information and consulting
c) state standardization, registration, certification
d) organization of proper storage of medicinal products e) continuing pharmaceutical education
3. The causes of conflicts are:
a) Clash of personalities
b) Limited resources
c) Difference in behavior and life experience d) Differences in beliefs and values
e) Differences in goals
f) Interconnectedness of tasks interdependence g) Unsatisfactory communications
h) Incorrect distribution of responsibilities
i) Unfair remuneration
– interview;

Examples of tasks:
The purpose and objectives of economic analysis. – interview;
Examples of tasks:
Application of the dynamic series method.
– interview;
Examples of tasks:
Psychology of pharmacy enterprise management.
Level 2–assessment of skills
The following types of control are used to evaluate learning outcomes in video lessons:
– tasks to solve a problem situation;
Examples of tasks:
Reflect the following cash receipts for March, 15 in the cash register (conditional indicators):
a) kiosk revenue;
b) the pharmacy's revenue (for March, 15 the journal of the registration of hospital turnover);
c) the revenue of the pharmacy for the sale of medical goods by the prescription and production department of the revenue from the over-the-counter issue 1.200.000 = based on the calculation of checks;
d) receipt of money from the State Bank for the payment of pharmacy employees' wages for the 1st half of March, vacation allowances for temporary disability
e) receipt of money in the amount of 1,000 = from the head of the pharmacy point Ivanova. S. on account No.57 disadvantages;
f) refund by the cleaning nurse of the unused accountable amount. She was given 2,000= for the purchase of auxiliary materials. The actual expenditure of money was the amount for which auxiliary materials were purchased;
g) receipt of the rental amount in the amount of 260 = for crutches;
h) receipt of money from the State Bank for issuing an advance sum of 8.000 = counting travel expenses.
– tasks resolution of a problem situation;
Examples of tasks:
For the planned year, the outpatient prescription was 90 thousand rec., inpatient- 60 thousand rec. for the previous year, the weekly weight of ready-made medicinal products was the following: 78%, 81%, 85%, in the current year, 87%, in-house procurement of finished

medicinal products amounted to 12%, 10%, 10%, respectively, and 9% in the current year. Develop a plan for the formulation of finished medicines, intra-apical preparation and individual formulation.
– tasks resolution of a problem situation;
Examples of tasks:
Calculate the profitability threshold (PR) and the margin of financial strength (ZFP). It is known that the gross income of 50 thousand rubles, the costs of circulation:
transportation costs 1 thousand rubles
payment for certification services 3 thousand rubles.
salaries 20 thousand rubles piecework salary 5.5 thousand rubles.
taxes 8 thousand rubles.
rent 2 thousand rubles.
utilities 2 thousand rubles.
natural loss 0.5 thousand rubles.
repair 1 thousand rubles.
depreciation charges 2 thousand rubles.

Level 3–assessment of skills
The following types of control are used to evaluate learning outcomes in the form of skills:
– tasks to test skills for decision-making in a situation of choice, in a problematic situation;
Example of tasks:
Analyze the situations and choose the most optimal management solution out of several possible ones using the selection methods of solutions. Justify the selected management solution.

Situation 1. The pharmacy has purchased an individual medical order for a particular patient, an expensive drug that is not in mass demand. After receiving the drug from the pharmacy, the patient refused to purchase it. Possible management solutions in this situation:
Return the drug to the supplier.
Leave the drug for sale at the pharmacy.
We are conducting an operation to stimulate demand for this drug.
Situation 2. The pharmacy received a drug that was not shown in the contract of sale. The drug is used by mass inquiry. Possible management solutions in this situation:
Return the drug to the supplier.
Leave the drug for sale at the pharmacy.
We are conducting an operation to stimulate demand for this drug.
– the task of checking the rules of the acceptance of the decision of the situation of the election, in the problem of the situation;
Examples of tasks:
The head of the pharmacy in the assistant room loudly, irritably reprimanded the pharmacist-analyst of the pharmacy, for making a mistake in filling in the journal, which he found while looking through this journal.
At the request of the analyst to listen to her, the head of the pharmacy did not react and went to the office. At the end of the shift, the pharmacist-analyst went into the manager's office, and silently put a journal and an explanatory note.

It turned out that the head of the pharmacy read her handwriting incorrectly, there was no mistake. On what the head of the pharmacy drugstore muttered: "That's a good thing there are mistakes."
Evaluate the behavior of the head of the pharmacy. What would you do in this situation?
– the task of checking the rules of the acceptance of the decision of the situation of the election, in the problem of the situation;
Examples of tasks:
Analyze the situation and give an answer, what adverse consequences can cause the decisions taken, how to avoid them. Offer your own solution to a specific situation.

Situation 1. Head. the pharmacy decided to destroy the medicines that had fallen into disrepair by throwing them into a dumpster.

Situation 2. The pharmacist of a wholesale pharmaceutical company decided to postpone the meeting time from 10:00 to 9 o'clock. At the same time, the head of the marketing department was not notified, the improvement of whose work was discussed at the meeting.

Situation 3. Head of the pharmacy purchased expensive equipment without taking into account the volume of work of the pharmacy. As a result, it is idle most of the working time.

QUESTIONS AND TASKS FOR EXAM PREPARATION
Theoretical questions

1. Principles of storage of pharmaceutical products. Normative documents
2. Subject-quantitative accounting in pharmaceutical organizations. List of medicines subject to subject-quantitative accounting. Normative document
3. Prescriptions rules for medicines containing narcotic medicines and psychotropic substances of list II. Issuance rate of Morphine hydrochloride, Omnopon and Codeine
4. Aseptic unit. Requirements for aseptic unit.
5. Requirements for quality control of sterile solutions
6. Main functions of pharmacies. Normative document
7. Classification of wholesale intermediaries
8. Federal program «Providing necessary medicines program»
9. Levels of goods distribution channels
10. Licensing requirements and conditions for pharmaceutical activity
11. Types of pharmaceutical organizations. Normative document
12. Rules for prescribing medicines on prescription form 148 -1/u-88
13. Regional program «Additional medicinal provision program»
14. Subject-quantitative accounting in pharmaceutical organizations. Registration of accounting documents
15. Sanitary and hygienic requirements for pharmacy staff
16. Features of hospital and inter-hospital pharmacies. Optimal norms of stock of medicines in pharmacies
17. Conditions for transportation and storage of immunobiological medicines
18. Main departments of pharmacy warehouse and their functions

19. Rules for submission of documents and information on medicinal products for medical use, introduced into civil circulation
20. Licensing of pharmaceutical activity. Normative document
21. Indicators of pharmacy`s economic and financial activity that are subject to economic analysis and planning
22. Planning hospital prescriptions by number of expected bed days
23. Analysis and planning of pharmacy`s stocks of goods
24. Classification of circulation costs of a pharmacy according to degree of dependence on trade turnover
25. Scheme of formation pharmacy`s net profit
26. Retail turnover planning for existing pharmacy
27. Analysis and planning of circulation costs of a pharmacy
28. Structural sections of business plan of a pharmacy
29. Price elasticity of demand
30. Simplified taxation system
31. Principles and stages of economic analysis
32. Planning retail turnover for newly opened pharmacy
33. Classification of resources of goods
34. Elements of stocks of goods. Calculation of an optimal order (an optimal stock) of goods
35. Classification of expenses of a pharmacy
36. Definitions and calculation of operating leverage, profitability threshold and financial safety margin of an organization
37. Advantages and principles of non-cash settlements
38. Areas of use, consumers and business plan developers
39. Consumer properties of a medicine
40. Unified tax on imputed income
41. Types of commodity-material values taken into account in a pharmacy
42. Scheme of accounting of retail turnover
43. Classification of fixed assets. Costs of fixed assets
44. Scheme of formation of wages (including compensation and incentive allowances)
45. Receipt cash operations
46. Reasons for carrying out inventory in a pharmacy
47. Types of balance accounts. Their structure, debit and credit
48. Increase in value of stocks of goods
49. Structure of balance
50. Sections of pharmacy's monthly report
51. Algorithm of acceptance of goods in a pharmacy. Acceptance control
52. Scheme of accounting of wholesale turnover
53. Scheme of accounting of auxiliary materials
54. Payment of labor vacation
55. Expenditure cash operations. Documents on accounting of cash in a pharmacy
56. Stages of inventory in a pharmacy
57. Purpose and main objectives of inventory in a pharmacy
58. Basic principles and elements of balance accounting
59. Objectives of balance accounting. The principle of double entry

60. Scheme of accounting of other articles of expense of goods
61. The main categories of pharmaceutical marketing.
62. Characteristics of the factors that form the need for medicines.
63. Features of determining the need for medicines, the consumption of which is strictly regulated.
64. Features of pharmaceutical information and advertising.
65. Forms of product promotion on the pharmaceutical market.
66. The concept of advertising, its types, the requirements imposed on it.
67. The concept of corporate style and its tasks.
68. Marketing researches
69. Advertising of medicines and pharmaceutical products
70. Merchandising in a pharmacy
71. Principles of management in the pharmacy
72. Interpersonal relations in a pharmacy
73. Labor duties of a pharmacist (pharmacist)
74. Recruitment to a pharmaceutical organization
75. Motivation and development of pharmaceutical personnel
76. Management methods in pharmaceutical management
77. Management styles in the pharmacy
78. Personnel management of the pharmacy
79. Functional - job descriptions
80. Conflicts between buyers and pharmacists

Practical tasks

Situation. Analyze the situation and describe what adverse consequences the decisions made can cause, how to avoid them. Offer your own solution to a specific situation.

The head of the pharmacy purchased expensive equipment without taking into account the volume of work of the pharmacy. As a result, it is idle most of the working time.

Situation. The head of the pharmacy loudly and irritably reprimanded the pharmacist-analyst for making a mistake when filling out the magazine.

The head of the pharmacy did not react to the analyst's request to listen to her and went to the office. At the end of the working day, the pharmacist-analyst went into the manager's office, and silently put the magazine and an explanatory note. It turned out that there was no error. What would you do if you were the head of the pharmacy in this situation?

Situation. During the inspection of the shop windows, the pharmacy manager found :

1) Phenibut tablets (Aminophenylbutyric acid, 250 mg) are located on the same shelf with painkillers

2) In the group of medicines for the treatment of varicose veins are shelftokers «Vitamins»

3) Cosmetics are presents without observing the color scheme

4) There was no price tag on some medicines

What merchandising mistakes did the pharmacist make? Tell us about the principles of merchandising in a pharmacy?

Situation. When analyzing the sales of medicines from the pharmacy, it turned out that the Arbidol brand was sold less by 27% compared to last year.

What could be the reason for the fall? What options can you use to increase sales of Arbidol at the pharmacy?

5.Perform pharmaceutical expertise of the prescription of the following composition:

Rp.: Barbamili – natrii 3,0
Analgini 1,0
Theophyllini 2,0
Spiritus aethilici 20,0
Aq. Purif. 200,0
M. D. S. A spoon 3 times a day

Specify form of the prescription, mandatory and additional details, validity of the prescription, shelf life in a pharmacy and determine its cost

Perform pharmaceutical expertise of the prescription of the following composition:

Rp: Ac. salicylici
Resorcini ana 0,5
Spiritus aethylici 70 % - 50,0
M.D.S. Treat the skin of the face 2 times a day

Specify form of the prescription, mandatory and additional details, validity of the prescription, shelf life in a pharmacy and determine its cost

Perform pharmaceutical expertise of the prescription № 1211 (Specify form of the prescription, mandatory and additional details, validity of the prescription and shelf life in a pharmacy) and dispense morphine solution 1% -1 ml 10 ampoules to an oncological patient.

Perform pharmaceutical expertise of the prescription № 1215 (Specify form of the prescription, mandatory and additional details, validity of the prescription and shelf life in a pharmacy) and dispense tablets of phenobarbital 0.1 № 100 to a patient.

Retail sales of a pharmacy for last 3 yeas: 60 thousand rubles, 70 thousand rubles, 78 thousand rubles, expected implementation for current year 91,5 thousand rubles and quarterly: 25 thousand rubles., 22.8 thousand rubles, 19.1 thousand rubles, 24.6 thousand rubles. Develop a plan of retail turnover for a year and by quarters.

Trade turnover of the current year is 560 thousand rubles, average level of trade overlays is 30%, average stocks of goods are 108.9 thousand rubles. rub. Determine current year's stocks of goods in days (using one-day turnover).

Determine pharmacy's profit for reporting period in total sum and by level. Pharmacy turnover is 250 thousand rubles; trade overlays are 69 thousand rubles. Level of circulation costs is 24 %.

Reflect the following economic operation on corresponding balance accounts:

Sale of goods for cash in amount of 5000 rubles

When receiving goods received from warehouse, shortage was found: 10 packages of tablets "Adebit" No. 40, cost of 1 package is 106 rub. The goods were stored in sealed container until

acceptance. The fillings are intact, the outer markings are clear and complete. Your actions. Fill out necessary documents

Within framework of forecasting need for limited-use medicines, correct, if necessary, the pharmacy's annual order for Omnopon, if it includes:
* Omnopone sol. 1% - 1.0 - 50 ampoules.
* Omnopone sol. 2% - 1.0 - 100 ampoules.
* The pharmacy serves 10 thousand residents.
The maximum consumption rate is 0.3 g per 1 thousand residents.
When checking the pricing procedure in the pharmacy, the following is established:
- Paracetamol tabl., wholesale price is 14 rubles, retail price is 18 rubles;
- Acetylsalicylic acid tabl., wholesale price is 24 rubles, retail price is 29rubles. Calculate the prices of medicines. Comment on the results using regulatory documents.

As part of operational and technical accounting in a pharmacy, calculate the wage of a pharmacy manager of III group for the remuneration of managers, whose work experience is 10 years.

In the current quarter:
• turnover on outpatient prescriptions in the pharmacy was 480 thousand rubles;
• dispensed goods to hospital № 5 in the amount of 400 thousand rubles;
• schools attached to medicinal services, bought goods in the amount of 100 thousand rubles;
• sold goods without prescriptions for 800 thousand rubles;
• revenue of kiosks amounted to 320 thousand rubles;
* in the next quarter, it is expected to sell goods to outpatients in the amount of 1700 thousand rubles; to organizations in the amount of 600 thousand rubles.
As part of analysis of financial and economic activity, calculate amount of increase in pharmacy turnover by types.

Reflect the following economic operation on corresponding balance accounts:
Deduction of income tax from wages in amount of 15000 rubles

Trade turnover of the current year is 560 thousand rubles, the average level of trade overlays is 30%, the average stocks of goods are 108.9 thousand rubles.
Determine the current year's stocks of goods in days (using one-day turnover).

Calculate wholesale and retail prices of Nootropil in caps. № 100. (The medicine is included in the"List of vital and essential medicines"). The manufacturer's price is 585 rubles.

EXAMPLE OF TICKET FOR EXAM

Ticket number №..

Main functions of pharmacies. Normative document. (20 points)
Retail turnover planning for existing pharmacy (20 points)
Reasons for carrying out inventory in a pharmacy (20 points)

Fundamentals of pharmaceutical management. (20 points)
Retail sales of a pharmacy for last 3 yeas: 60 thousand rubles, 70 thousand rubles, 78 thousand rubles, expected implementation for current year 91,5 thousand rubles and quarterly: 25 thousand rubles., 22.8 thousand rubles, 19.1 thousand rubles, 24.6 thousand rubles. Develop a plan of retail turnover for a year and by quarters. (20 points)

Standard answer
1 question. Main functions of pharmacies. Normative document.
In accordance with Order of Ministry of Health of the Russian Federation No. 780n of 31.07.2020 "On approval of types of pharmaceutical organizations"
there are following functions of pharmacies
health protection, including first aid, information about medicines among health professionals, pharmaceutical care
trading, including purchase of medicines, acceptance of medicines, placement and storage of medicines in accordance with their physico-chemical properties, sale of medicines to population and hospitals
production, including individual production of medicines, serial production of medicines, quality control of medicines
2 question. Retail turnover planning for existing pharmacy.
Retail turnover is number of goods sold to population in monetary terms.
Pharmacy's retail turnover consists of
Turnover on outpatient prescriptions
Turnover for over-the-counter medicines
Turnover of small retail network
Retail turnover planning for an existing pharmacy
stage. Analysis of dynamics of trade turnover indicators for number of previous years
Example of analysis of dynamics of trade turnover indicators
We need to calculate percentage growth
We need to find *dynamics* of this indicator by the years

1 year	2 year	3 year	4 year	5 year
20	22	23	26	27

What we do by steps:
1. We calculate absolute increase (or decrease) of indicator in every subsequent year with comparision of previous year.
22 – 20 = 2
23 – 22 = 1
26 – 23 = 3
27 – 26 = 1
2. We calculate growth rates in form of
- coefficient

$\frac{22}{20} = 1.1$

$\frac{23}{22} = 1.04$

$\frac{26}{} = 1.13$

23
27 = 1.03
26
- in percent
20 - 100%
22 - X
X = 22 * 100 = 110% , 110% - 100% = 10%
20

22 - 100%
23 - X
X = 23 * 100 = 104% , 104% - 100% = 4%
22
23 - 100%
26 - X
X = 26 * 100 = 113% , 113% - 100% = 13%
23

26 - 100%
27 - X
X = 27 * 100 = 103% , 103% - 100% = 3%
There are chain growth rates
3. We calculate average percent of growth in this dynamic series
10% + 4% + 13% + 3% = 7.5%
4
7.5% is average percent of growth
4. We plan the indicator to the next year
- 100%
X - 107.5%
X = 27 * 107.5 = 29
100
stage. Planning based on trend that has developed over number of years, using results of analysis of indicators of dynamic series
(limiting use of this method: changes in factors that affect turnover indicators)
3 question. Reasons for carrying out inventory in a pharmacy.
Reasons for carrying out inventory in a pharmacy
preparation of annual accounting report (not earlier than October 1 of reporting year)
change of materially responsible persons
identification of facts of theft or damage to property
natural disasters, fire or other emergencies caused by extreme conditions
reorganization (relocation) or liquidation of a company
Special reasons for carrying out inventory in a pharmacy with collective form of financial responsibility
change of a head of an organization
dismissal of more than 50% of organization`s members

requirement of one or more organization`s members

4 question. Fundamentals of pharmaceutical management

Management is a complex of principles, methods, means and forms of administration for business organizations to improve their efficiency and increase profits in market conditions.

The fundamental feature of every organization is division of labor into it. There are two types of division: horizontal and vertical. The horizontal division of labor involves differentiation of the labor process, which leads to the formation of organizational departments. The vertical division of labor is used to differentiate between administrative work in coordinating all activities of the organization to be taken to achieve its objectives. This vertical division of labor of leaders forms the levels of management. The main elements of the management structure are the links (horizontal) and the levels (vertical). The link management is an independent administrative body, directly reporting to line managers.

Functions of management:

1. Planning
2. Organizing
3. Staffing
4. Directing
5. Coordinating
6. Controlling

The feature of management of pharmaceutical companies is combining the functions of drug supply with the scientific, industrial, control, analytical, commercial, medical, information functions. In the pharmaceutical company's methods of trading management, coupled with the knowledge of organizational and legal issues of pharmacies, technology, medicine, pharmaceutical analysis and control, pharmacology, pharmacotherapy, pharmaceutical care, pharmaceutical ethics and deontology, psychology, etc. are widely used. It is important to the implementation of medicines and other goods, involving direct contact with consumers. Pharmacies are the final link in the chain of goods movement of pharmaceutical products. It defines such management tasks as formation of market information, demand for drugs and other pharmaceutical products assortment of the consumer preferences. With increasing competition among pharmacies organizational forms, attracting customers, expanding value added services, contacts with medical and other organizations, consumers, create and preserve the image of the pharmacy become very important

In the process approach there are four basic functions of management: planning, organization, motivation and control, they are interconnected and form the cycle of management. The object of management is a separate department or organization as a whole, which is directed to the control action. The subject of management is a management body or a person performing the control action.

Implementation of the management process requires:

a) the availability of the system (organization);
b) setting goals;
c) modelling of the desired system state;
d) a strict keeping to the impact process on the system in accordance with the objectives

Basic principles of management: Unity of command, Distribution of labor, Motivations, Leadership, Scientific, Responsibilities, Hierarchies, Selection and placement of personnel, Solvency, Expediency, Sequences of management actions

5. Practical task. Retail sales of a pharmacy for last 3 yeas: 60 thousand rubles, 70 thousand rubles, 78 thousand rubles, expected implementation for current year 91.5 thousand rubles and quarterly: 25 thousand rubles., 22.8 thousand rubles, 19.1 thousand rubles, 24.6 thousand rubles. Develop a plan of retail turnover for a year and by quarters.

We need to analyse of dynamics of trade turnover indicators for number of previous years using method of dynamic series

We need to calculate percentage growth

We need to find *dynamics* of this indicator by the years

1 year	2 year	3 year	4 year
60	70	78	91.5

What we do by steps:

1. We calculate absolute increase of indicator in every subsequent year with comparision of previous year.

60 – 70 = 10

78 – 70 = 8

91.5 – 78 = 13.5

2. We calculate growth rates

- in percent

60 - 100%

70 - X

$X = \frac{70 * 100}{60} = 117\%$, 117% - 100% = 17%

70 - 100%

78 - X

$X = \frac{78 * 100}{70} = 111\%$, 111% - 100% = 11%

78 - 100%

91.5 - X

$X = \frac{91.5 * 100}{78} = 113\%$, 117% - 100% = 17%

There are chain growth rates

3. We calculate average percent of growth in this dynamic series

$\frac{17\% + 11\% + 17\%}{3} = 15\%$

15% is average percent of growth

4. We plan the indicator to the next year

- 100%

X - 115%

$X = \frac{91.5 * 115}{100} = 105.22$ thousand rubles

We determine the structure of retail sales by quarters in percentage in the current year

91.5 – 100%

25 – X 1 quarter

X = 27.32 %

91.5 – 100%
22.8 – X 2 quarter

X = 24.91%

91.5 – 100%
19.1 – X 3 quarter

X = 20.87%

91.5 – 100%
24.6 – X 4 quarter

X = 26.88%

5. Next, we find retail sales for the next year by quarter. To do this, we transfer the quarterly retail sales structure found for the current year to the next year's retail sales plan.

105.22 – 100%
X – 27.32 % 1 quarter
X = 28.75 thousand rubles

105.22 – 100%
X – 24.91% 2 quarter
X = 26.21 thousand rubles

105.22 – 100%
X – 20.87% 3 quarter
X = 21.96 thousand rubles

105.22 – 100%
X – 26.88% 4 quarter
X = 28.28 thousand rubles

Evaluation of exam answer

The exam ticket consists of 5 questions: 4 of them are theoretical questions, 5th one is a task, which should be solved.

Answers for these questions are evaluated by 20 points.

Total: 5 x 20 = 100 points

PHARMACEUTICAL ECOLOGY

Teachers: Assistant of the Institute of Pharmacy Elizabeth Baltaeva, Assistant of the Institute of Pharmacy Ulyana Zabolotnaya
Building, Department, classroom # 16 Fatykh Amirkhan Street, Institute of Pharmacy, 421.
Contact details:
Telephone number: +7 (843) 521-16-42 (Guzel Ganieva)
E-mail address: institute.pharmacy@kazangmu.ru (Guzel Ganieva)
Office and working hours: 201 (9-17)

Total hours 216:
Lectures 32 hours;
Practical classes 90 hours;
Independent work 58 hours;
Control 36 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=2933).__
Course objectives: The purpose of mastering the discipline

The goals of mastering the pharmaceutical ecology discipline to form students' competencies in the field of the basics of general ecology and special pharmaceutical ecology, necessary to solve issues in the field of environmental management and minimize the influence of environmental pollution factors in the organization of chemical and pharmaceutical enterprises.
Tasks of the discipline:
- To reveal the basic concepts of pharmaceutical ecology and its role in the professional activity of a pharmacist;
- To assess the possibilities of the influence of pharmaceutical industry factors on the environment;
- To consider the impact of the pharmaceutical industry on human health.

Course topics:
Calendar plan of lectures
VII semester

1. Pharmaceutical ecology. Sources of emissions of pollutants into the environment. Pharmaceutical sector enterprises as a source of environmental pollution. Waste of pharmaceutical enterprises. Environmental legislation.
2. Wastewater. Classification of waste waters of chemical production. Standardization of wastewater quality. Cleaning and neutralization methods.
3. Wastewater analysis methods. Contaminants. Methods for the analysis of pollutants.
4. Sampling methods and sample preparation of wastewater from chemical and pharmaceutical enterprises. Organoleptic methods of analysis. Physical and chemical methods for the analysis of wastewater from chemical and pharmaceutical enterprises. Determination of water hardness.
5. Sources and composition of atmospheric air pollution. Hazard classes of air pollutants. Rationing. Purification of industrial emissions from dust and gases. Methods for sampling and analysis of pollutants in industrial emissions.
6. Chemical and physical methods for the analysis of pollutants in industrial emissions. Determination of the concentration of dust in the air.
7. Wastes of production and consumption. Maximum permissible soil concentrations. Waste toxicity classes. Waste recycling. Waste-free and low-waste production.
8. Medical waste. Legislation in the field of medical waste management. Waste certificates.

VIII semester

1. Environmental pollution with heavy metals. Methods for the analysis of heavy metals. Determination of heavy metals in dosage forms.
2. Pollution of the environment with pesticides.
3. Environmental pollution with radionuclides.
4. Food colors and flavors.
5. Nutritional supplements. Classification of nutritional supplements. Biologically active food supplements.
6. Medical waste. Legislation in the field of medical waste management. Waste certificates. Human ecology. The influence of the environment on health.
7. Ecology and human health. Ecological and hygienic importance of nutrition
8. Ecology of labor at pharmaceutical enterprises and pharmacy organizations.

Calendar plan of laboratory classes

VII semester

1. Pharmaceutical ecology. Sources of emissions of pollutants into the environment. Pharmaceutical sector enterprises as a source of environmental pollution.
2. Waste from pharmaceutical companies. Environmental legislation.
3. Wastewater. Classification of wastewater from chemical industries. Standardization of wastewater quality. Cleaning and neutralization methods
4. Waste water analysis methods. contaminants. Contaminant Analysis Methods
5. Sampling methods and sample preparation of wastewater from chemical and pharmaceutical enterprises. Organoleptic methods of analysis
6. Physical and chemical methods for the analysis of wastewater from chemical and pharmaceutical enterprises. Determination of water hardness.
7. Control work on topics 1.1. - 1.6

8. Sources and composition of atmospheric air pollution. Hazard classes of air pollutants. Rationing.
9. Purification of industrial emissions from dust and gases. Methods for sampling and analysis of pollutants in industrial emissions.
10. Chemical and physical methods for the analysis of pollutants in industrial emissions. Determination of the concentration of dust in the air
11. Control work on topics 2.1. - 2.3.
12. Wastes of production and consumption. Maximum permissible soil concentrations.
13. Waste toxicity classes. Waste recycling. Waste-free and low-waste production.
14. Medical waste. Legislation in the field of medical waste management. Waste certificates.
15. Control work on topics 3.1. - 3.3.

VIII semester

1. Environmental pollution with heavy metals.
2. Methods for the analysis of heavy metals. Determination of heavy metals in dosage forms.
3. Pollution of the environment with pesticides.
4. Environmental pollution with radionuclides.
5. Control work on topics 4.1. - 4.4.
6. Food colors and flavors.
7. Nutritional supplements. Classification of nutritional supplements
8. Biologically active food supplements. Methods of analysis of biologically active food supplements.
9. Control work on topics 5.1. - 5.3.
10. Ecology and economics of pharmaceutical enterprises. Environmental law. Fundamentals of rational nature management.
11. Human ecology. The influence of the environment on health.
12. Ecology and human health. Ecological and hygienic importance of nutrition
13. Ecology of labor at pharmaceutical enterprises and pharmacy organizations.
14. Control work on topics 6.1.- 6.4.
15. Final lesson. Outcoming testing. Final test.

Text books and required supplies:

1. Basic literature
2. Pharmaceutical Ecology. - Москва : ГЭОТАР-Медиа, 2022. - 312 с. - ISBN 978-5-9704-6599-8. - Электронная версия доступна на сайте ЭБС "Консультант студента" : [сайт]. URL: https://www.studentlibrary.ru/book/ISBN9785970465998.html - Текст: электронный
3. Additional literature
4. Russian-English Dictionary of Pharmacy Terminology [Electronic English-Russian Dictionary of Pharmaceutical terms [Electronic resource]: for training. according to spec. 33.05.01 "Pharmacy" / Kazan State Medical University The University of Public Health grew. Federation, Dep. foreign language.; [comp. O. Y. Makarova et al.]. - Electron. text data. (759 KB). - Kazan : KSMU, 2018. - 173, [1] p.
5. Group of substances isolated by mineralization ("metallic" poisons) [Electronic resource]: textbook.- the method manual on toxicologycal chemistry for 4th year full-time students

pharmacy. dep. / Kazan State Medical University The University of Public Health grew. Federation, Department of Pharmaceutical chemistry with anal courses and toxicologycal chemistry; [comp.: I. K. Petrova, R. I. Mustafin]. - The electron. text data. (632 KB). - Kazan : KSMU, 2013. - 76 p.

6. Laboratory work [Electronic resource]: textbook.- the method manual on toxicologycal chemistry for 4th year full-time students / Kazan State Medical University The University of Public Health grew. Federation, Department of Pharmaceutical chemistry with analyte courses. and toxicol. chemistry; [comp.: L. A. Zhigalko, R. I. Mustafin]. - The electron. text data. (473 Kb). - Kazan : KSMU, 2011. - 50 p.
7. Fundamentals of chromatography [Electronic resource]: textbook.- the method manual for students of the pharmaceutical faculty. / Kazan State Medical University The University of Public Health grew. Federation, Department of Pharmaceutical chemistry with analyte courses. and toxicologycal chemistry; [comp.: S. A. Sidullina, N. M. Nasybullina]. The electron. text data. (374 Kb). - Kazan : KSMU, 2013 - Part 2 : Ion exchange and thin-layer chromatography. - 2013. - 50 p.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment

- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of control work No. 1.

1. Ways of environmental pollution by drugs.
2. Categories of objects that have a negative impact on the environment, depending on the level of such impact.
3. Determination of chlorides in wastewater.
4. Mechanical methods of wastewater treatment.
5. In the water of the reservoir were found:
   phenol - 0.0006 mg/l;
   toluene - 0.03 mg/l;
   butyl alcohol - 0.08 mg / l;
   pyridine - 0.05 mg / l;
   kerosene - 0.003 mg/l;
   bismuth - 0.04 mg/l;
   nitroethane - 0.02 mg / l.

Group these substances according to limiting signs.
Make a conclusion about the compliance of the water quality of the reservoir with hygienic requirements.

Example of control work No. 2.

1. Maximum allowable emission, definition.
2. Sanitary protection zones.
3. Give diagram and describe the principle of the absorber.
4. Determine the maximum allowable emission of suspended solids into the atmosphere for an emission source located in Penza (flat open area) with the following parameters: pipe height - 42 m (H), pipe mouth diameter - 1.0 m (D) , the volume of the dust-air mixture is 3 m3/s (V), the emission temperature is 60 °C (te), the ambient air temperature is 23.8 °C (ta), the maximum single maximum allowable concentration of suspended dust is 0.5 mg/m3 (MACsing.), background concentration - 0 mg / m3 (Cb), the degree of air purification from dust - 80%.

Example of control work No. 3.

1. Give the definition of waste management and its constituents.
2. Processes that are included in accounting the waste.
3. Waste burial. Methods of burying industrial waste.
4. Equipment of room for storage of medical waste and storage conditions depending on the hazardous class.

Example of control work No. 4.

1. Arsenic toxicity.
2. Pesticides. Toxicological significance.
3. Radionuclides. Sources.

Example of control work No. 5.

1. Classification of food additives by technological functions.
2. Toxicity role of food additives.
3. Equivalence and purity of food additives.

Example of control work No. 6.

1. Characteristics of pharmacy organizations and pharmaceutical industrial enterprises.
2. Diet food.
3. Unfavorable factors in the activities of pharmacy organizations.

EVALUATION OF THE MODULE ANSWER
The question card of the module consists of 3, 4 or 5 questions.
Control work No. 1.
Questions 1 - 5 are evaluated by 20 points (with the step of 5 points).
Total: 5 x 20 = 100 points.
Control work No. 2, 3.
Questions 1 - 4 are evaluated by 25 points (with the step of 5 points).
Total: 4 x 25 = 100 points.
Control works No. 4, 5, 6.
Questions 1 - 2 are evaluated by 33 points (with the step of 5 points).
Questions 3 is evaluated by 34 points (with the step of 5 points).
Total: 2 x 33 + 34 = 100 points.

Example of exam ticket

Ways of environmental pollution by drugs.
Physicochemical methods of wastewater treatment.
MAC single, definition.
Mercury toxicity.
Pollution of environment with radionuclides.

EVALUATION OF EXAM ANSWER
The question card of the exam paper consists of 5 questions.
Questions 1 - 5 are evaluated by 20 points (with the step of 5 points).
Total: 5 x 20 = 100 points.

TOXICOLOGICAL CHEMISTRY

Teachers: Gordeeva Daria
Building, Department, classroom Institute of Pharmacy, Fatykh Amirkhan street, 16, 419 room

Contact details:
Telephone number: +7 (843) 521-16-42 (Ganieva Guzel)
E-mail address: institute.pharmacy@kazangmu.ru
Office and working hours: 201 (9-17)
Total hours: 252 h
-Lectures: 36 h
-Practical classes: 104 h
-Independent work: 76 h
-Control: 36 h

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=1962).

Course objectives: The purpose of mastering the discipline
The goals of mastering the toxicological chemistry discipline are participation in the development of relevant competencies with the aim of mastering the methodology of systemic chemical-toxicological analysis, developing skills and abilities to prepare for professional activities in the specialties: "Pharmacy", "Forensic Medical Examination" and "Clinical Laboratory Diagnostics".
Tasks of the discipline:
1. Acquisition of theoretical knowledge on the legal basis for conducting forensic and narcological examination in the Russian Federation, on the main issues of biochemical toxicology, methods of isolating toxic substances from objects of biological and other origin during various types of chemical-toxicological analysis.
2. Formation of the ability to organize and perform chemical-toxicological analysis taking into account the specifics of forensic examination, analytical diagnostics of drug addiction and acute poisoning of chemical etiology using modern chemical and physicochemical methods.
3. Acquisition of skills and competencies to carry out a systemic chemical-toxicological analysis in accordance with legislative and regulatory documents.
4. Consolidation of theoretical knowledge on the basics of general, inorganic, analytical and organic chemistry in close connection with other pharmaceutical and medical-biological disciplines.

Course topics:

Calendar plan of lectures

VII semester

Section 1. General questions of toxicological chemistry

1. Toxicological chemistry as a science, its definition and content, goals, objectives. Communication with other disciplines. Poisonous substance concept. Sections of toxicological chemistry. Types of poisoning. Classification of poisoning.
2. Specialties requiring the application of knowledge of toxicological chemistry. Chemical and toxicological analysis of medicinal and narcotic substances in acute poisoning for the purpose of diagnosis and treatment. Goals, venue, features, objects of research. Forensic chemical analysis of material evidence. Goals, venue, features, objects of research. Rules for sending objects for examination. Chemical and toxicological analysis of narcotic drugs, psychotropic and other toxic substances causing intoxication (intoxication). Goals, venue, features, objects of research. Sanitary and hygienic research and testing. Goals, venue, features, objects of research. Examination of narcotic, potent substances and other objects (liquids) withdrawn from illegal circulation. Goals, location, features, objects of research
3. Classification of toxic substances.
4. Characteristics of objects of forensic-chemical and chemical-toxicological analysis. Directed and undirected analysis. Rules and sequence of forensic chemical examination and chemical toxicological analysis. Accompanying documents. External inspection of the object. Preliminary tests of the object, their role in the analysis. Drawing up an analysis plan. Preparation of objects for analysis. Body detoxification methods.

Section 2. Group of substances isolated by mineralization method ("metal poisons")

1. A group of substances isolated from an object by mineralization. Toxicological significance of "metal poisons". Toxicokinetics. Features of the action of compounds of each cation on the body. Poisoning clinic. Research objects. Methods for isolating "metal poisons" from biological objects.
2. General and specific isolation methods. Mineralization method diagrams. Isolation of mercury from biological objects. Isolation scheme. Theoretical foundations of the fractional method of mineralizate analysis, features. Scheme of the analysis of the mineralizate for metal and arsenic ions. Analysis of destructate for mercury ion. Methods for the quantitative determination of "metal poisons": chemical methods and atomic absorption spectroscopy.

Section 3. Group of substances isolated by distillation ("volatile poisons")

1. "Volatile Poisons". Physical properties. Toxicological significance. Toxicokinetics and metabolic pathways. Isolation of "volatile poisons": simple distillation, steam distillation, micro-distillation, micro-diffusion method. Rules for isolating and collecting distillates. Distillate analysis schemes. Methods for quantitative determination.
2. Alcohol intoxication. Ethanol. Alcohol surrogates. The social significance of alcoholic intoxication. Evaluation of the degree of intoxication. Preliminary and basic analysis of objects for alcohol. GLC method in the analysis of ethyl alcohol in biological objects, food and technical liquids, in alcohol surrogates. Determination of the degree of alcoholic intoxication.

Section 4. Group of substances isolated by extraction and sorption (medicinal and narcotic substances, pesticides).

1. General characteristics of drugs and narcotic drugs, psychotropic and other toxic substances: the prevalence and cause of poisoning, childhood drug poisoning. Toxic doses and toxic concentrations, relationship with toxic effects. Toxicological significance. Toxicokinetics of medicinal and narcotic substances. Characteristics of the objects of analysis for medicinal substances (internal organs, blood, urine, hair, nails, etc.). Influence of endogenous compounds on the analysis results. Preparation of biological objects for analysis.
2. General characteristics of modern methods of isolation of medicinal and narcotic substances and their metabolites from various objects. Stages of isolation of medicinal substances from biological objects. Factors influencing at each stage. Methods for cleaning extracts at each stage.

VIII semester

Section 4. Group of substances isolated by extraction and sorption (medicinal and narcotic substances, pesticides).

1. Medicines derived from barbituric acid (barbital, phenobarbital, butobarbital, barbamil, sodium ethaminal). Toxicological value, clinic of poisoning, toxicinetics, metabolic pathways. Isolation, detection and quantification methods.
2. Quantitative determination methods. Chemical and physicochemical methods: optical methods - photocolorimetry, extraction photometry, spectrophotometry in the UV and visible regions (direct and differential), fluorimetry; chromatography-mass spectrometry; GLC and HPLC methods; immunochemical methods.
3. Medicines derived from 1,4 - benzodiazepine: chlordiazepoxide, diazepam, oxazepam, nitrazepam. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods. Features of isolation and detection of 1,4 - benzodiazepine derivatives in directional analysis.
4. Phenothiazine derivatives: levomepromazine, promethazine, sonapax, chlorpromazine. Toxicological significance, clinic of poisoning, toxic kinetics, metabolic pathways. Isolation, detection and quantification methods.
5. Pyrazolone derivatives - phenazone, propyphenazone, metamizole sodium. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
6. Purine derivatives - caffeine. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
7. Phenylalkylamine derivatives: ephedrine, ephedrone, amphetamine, methamphetamine, methylenedioxymethamphetamine (MDMA). Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
8. Tropane derivatives: atropine, scopolamine, cocaine. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
9. Derivatives of pyridine and piperidine: anabazine, nicotine, pachicarpin. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
10. Quinoline derivatives - quinine. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.

11. Opiates: morphinan derivatives (morphine, codeine), benzylisoquinoline derivatives (papaverine, narcotine). Toxicological and social significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods. Semisynthetic derivatives of morphinan: ethylmorphine, diacetylmorphine (heroin). The synthetic analogue by the action of morphine is trimeperidine. Toxicological and social significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
12. Cannabis "drugs": marijuana, hashish and hash oil. Psychoactive components. Toxicological and social significance, clinic of poisoning, toxico-kinetics, metabolic pathways. Research objects. Pharmacognostic research of plant raw materials. Preparation of objects for analysis. Isolation, detection and quantification.
13. Indole derivatives - strychnine. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
14. General characteristics of pesticides. The history of the creation and use of pesticides. Classification. Environmental protection, the problem of pesticide residues. Toxicological significance, toxicokinetics. Detoxification methods. Methodological approach to pesticide analysis.
15. General characteristics of organochlorine pesticides. Toxicological value, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation-detection methods, definitions and definitions.
16. General characteristics of phosphorus-containing pesticides. Toxicological value, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation and detection methods in biological material and liquids. GLC method in their analysis.
17. Inorganic pesticides: compounds of barium, thallium, copper, arsenic. Toxicological significance, clinic of poisoning, toxicokinetics, isolation, detection, methods of determination.

Section 5. Group of substances isolated by water (mineral acids, alkalis, salts) and by private methods (fluorides). Poisonous gases.

1. Mineral acids (nitric, sulfuric, hydrochloric), alkalis (sodium, potassium hydroxides, ammonia solution), salts (nitrates, sodium and potassium nitrites). Toxicological significance, clinic of poisoning, toxicokinetics, objects of research. Isolation, detection and quantification methods.
2. Carbon monoxide (II). Physicochemical characteristics. Sources and causes of poisoning, clinic of poisoning, toxicokinetics. Research objects (blood, air). Detection of carbon monoxide (II) by spectroscopic method and chemical reactions. Microdiffusion method. Gas adsorption and spectrophotometric methods in the analysis of carbon monoxide (II).

Calendar plan of laboratory classes

VII semester

1. Toxicological chemistry as a special discipline. Chemical and toxicological analysis.
2. Rules and order of work in the laboratory, safety requirements.
3. Introduction to Toxicological Chemistry. Chemical and toxicological analysis, its specificity, main directions.
4. Characteristics of objects of forensic chemical and chemical toxicological analysis. Directed and undirected analysis. Rules and sequence of carrying out forensic chemical

examination and chemical toxicological analysis. Accompanying documents. External inspection of the object. Preliminary tests of the object, their role in the analysis. Drawing up an analysis plan. Preparation of objects for analysis.

5. Classification of toxic substances.
6. Legal bases of chemical and toxicological analysis.
7. Organization of forensic chemical expertise and chemical toxicological analysis in the Russian Federation. Acquaintance with documents regulating forensic chemical examination and chemical toxicological analysis. The rights and obligations of chemical experts.
8. Body detoxification methods.
9. Methods for isolating "metal poisons" from biological objects. Fractional (chemical) method for the analysis of metal poisons.
10. Toxicological significance of "metal poisons". Toxicokinetics. Features of the action of compounds of each cation on the body. Poisoning clinic. Research objects
11. Study of the mineralizate analysis scheme. Analysis of sediment for barium and lead ions, filtrate for manganese and chromium ions.
12. Study of the mineralizate analysis scheme. Complex use of various types of chemical reactions to detect ions of silver, copper, zinc, cadmium, bismuth.
13. Fractional method of analysis of mineralizate for the presence of arsenic, antimony, thallium.
14. Educational forensic chemical examination for "metal poisons". Execution of a conclusion based on the results of the analysis of mineralizate and destructate in the form of an "Act of forensic chemical research" or "Expert opinion".
15. Control 1
16. Methods for isolating "volatile poisons" from various objects. Features of isolation of certain "volatile poisons". Chemical method for the analysis of distillate. Study of the scheme for the analysis of distillate for hydrocyanic acid (cyanides).
17. "Volatile Poisons". Physical properties. Toxicological significance. Toxicokinetics and metabolic pathways. Isolation of "volatile poisons": simple distillation, steam distillation, micro-distillation, micro-diffusion method. Rules for isolating and collecting distillates.
18. Study of the scheme for analyzing the distillate for toxic alkyl halides, aldehydes and ketones, phenols.
19. Ethyl alcohol and its surrogates. Study of the scheme for analyzing the distillate for methyl, ethyl, isoamyl alcohols.
20. Alcohol intoxication. Ethanol. Alcohol surrogates. The social significance of alcoholic intoxication. Evaluation of the degree of intoxication. Preliminary and basic analysis of objects for alcohol.
21. Analysis methods used in analytical diagnostics of alcoholic intoxication and in forensic chemical examination: preliminary samples, chemical and biological methods.
22. gas chromatography method in the analysis of ethyl alcohol in biological objects, food and technical fluids, in alcohol surrogates. Determination of the degree of alcoholic intoxication.
23. Educational forensic chemical examination for "volatile poisons". Drawing up a conclusion on the results of the analysis of the distillate in the form of a "Forensic Chemical Research Act" or "Expert Opinion".

24. Control 2.
25. Final test

VIII semester

1. Isolation of medicinal and narcotic substances from biological objects. Theoretical foundations of isolation. General and private isolation methods.
2. General characteristics of drugs and narcotic drugs, psychotropic and other toxic substances: the prevalence and cause of poisoning, childhood drug poisoning. Toxic doses and toxic concentrations, interconnection with toxic effect. Toxicokinetics of medicinal and narcotic substances. Characteristics of the objects of analysis for medicinal substances (internal organs, blood, urine, hair, nails, etc.). Influence of endogenous compounds on the analysis results. Preparation of biological objects for analysis. General characteristics of modern methods of isolation of medicinal and narcotic substances and their metabolites from various objects. Stages of isolation of medicinal substances from biological objects. Factors influencing at each stage. Methods for cleaning extracts at each stage. Basic methodological approaches to forensic chemical examination and chemical toxicological analysis.
3. Medicines derived from pyrimidine-2,4,6-trione (barbiturates).
4. Medicines derived from barbituric acid (barbital, phenobarbital, butobarbital, barbamil, sodium ethaminal). Toxicological significance, clinic of poisoning, toxicinetics, metabolic pathways. Isolation, detection and quantification methods.
5. Determination of the content of barbiturates in biological objects by photocolorimetric and spectrophotometric methods.
6. Quantitative determination methods. Chemical and physico-chemical methods: optical methods - photocolorimetry, extraction photometry, spectrophotometry in the UV and visible regions (direct and differential), fluorimetry; chromatography-mass spectrometry; GLC and HPLC methods; immunochemical methods.
7. Medicines derived from 1,4 - benzodiazepine and phenothiazine.
8. Medicines derived from 1,4 - benzodiazepine: chlordiazepoxide, diazepam, oxazepam, nitrazepam. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods. Features of isolation and detection of 1,4 - benzodiazepine derivatives in directional analysis.
9. Phenothiazine derivatives: levomepromazine, prometazine, sonapax, chlorpromazine. Toxicological significance, clinic of poisoning, toxicinetics, metabolic pathways. Isolation, detection and quantification methods.
10. Medicines derived from pyrazole, purine derivatives, phenylalkylamine derivatives.
11. Pyrazolone derivatives - phenazone, propyphenazone, metamizole sodium. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
12. Medicines derived from purine - caffeine. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
13. Phenylalkylamine derivatives: ephedrine, ephedrone, amphetamine, methamphetamine, methylenedioxymethamphetamine (MDMA). Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.

14. Study of methods for the detection of tropane derivatives, pyridine and piperidine derivatives, quinoline derivatives.
15. Tropane derivatives: atropine, scopolamine, cocaine. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
16. Derivatives of pyridine and piperidine: anabazine, nicotine, pachicarpin. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
17. Quinoline derivatives - quinine. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
18. Opiates: derivatives of morphinan, derivatives of benzylisoquinoline. Semisynthetic derivatives and synthetic analogs by the action of morphine.
19. Opiates: derivatives of morphinan (morphine, codeine), derivatives of benzylisoquinoline (papaverine, narcotine). Toxicological and social significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods. Semi-synthetic derivatives of morphinan: ethylmorphine, diacetylmorphine (heroin). A synthetic analogue for the action of morphine is trimeperidine. Toxicological and social significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
20. Educational forensic chemical examination for "medicinal poisons". Drawing up a conclusion on the results of the analysis in the form of an "Act of forensic chemical research" or "Expert opinion".
21. Control 3
22. Pesticides: organochlorine derivatives (OCs).
23. General characteristics of pesticides. The history of the creation and use of pesticides. Classification. Environmental protection, the problem of pesticide residues. Toxicological significance, toxicokinetics. Detoxification methods. Methodological approach to pesticide analysis.
24. General characteristics of organochlorine pesticides. Toxicological value, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods.
25. Pesticides: organophosphate derivatives (OPEs), carbamic acid esters. Organic compounds of mercury. Pesticides of inorganic nature.
26. General characteristics of phosphorus-containing pesticides. Toxicological significance, clinic of poisoning, toxicokinetics, metabolic pathways. Isolation, detection and quantification methods in biological material and body fluids. GLC method in their analysis.
27. Inorganic pesticides: compounds of barium, thallium, copper, arsenic. Toxicological significance, clinic of poisoning, toxicokinetics, methods of isolation, detection, quantitative determination.
28. A group of substances isolated by infusion with water in combination with dialysis.
29. Mineral acids (nitric, sulfuric, hydrochloric), alkalis (sodium, potassium hydroxides, ammonia solution), salts (nitrates, sodium and potassium nitrites). Toxicological significance, clinic of poisoning, toxicokinetics, objects of research. Isolation, detection and quantification methods.

30. A group of substances that do not require isolation.
31. Carbon monoxide (II). Physicochemical characteristics. Sources and causes of poisoning, clinic of poisoning, toxicokinetics. Research objects (blood, air-spirit). Detection of carbon monoxide (II) by spectroscopic method and chemical reactions. Microdiffusion method. Gas adsorption and spectrophotometric methods in the analysis of carbon monoxide (II).
32. Control 4
33. Testing of skills by solving a situational task to analyze objects for "medicinal poisons".
34. Test lesson. Final test control for 3, 4 modules.

Text books and required supplies:

1. Vergeichik T. Kh. Toxicological Chemistry [Text]: textbook for students of pharmaceutical universities and faculties / T. Kh. Vergeichik; edited by E. N. Vergeichik. - 4th ed. - Moscow: MEDpress-inform, 2013. - 430, [2] p.
2. Pletneva T. V. Toxicological Chemistry [Electronic resource] / T. V. Pletneva, A. V. Syroeshkin, T. V. Maksimova; Ed. by T. V. Pletneva. - Moscow: GEOTAR-Media, 2013. - http://www.studentlibrary.ru/book/ISBN9785970426357.html
3. Toxicological Chemistry. Analytical Toxicology [Electronic resource]: textbook / S. A. Eremin, G. I. Kaletin, N. I. Kaletina et al. Edited by R. U. Khabriev, N. I. Kaletina. - M.: GEOTAR-Media, 2010. - http://www.studentlibrary.ru/book/ISBN9785970415375.html
4. Toxicological Chemistry. Metabolism and Analysis of Toxicants [Electronic resource]: textbook for students of medical and pharmaceutical universities / [E. Yu. Afanasyev [et al.]; edited by prof. N. I. Kaletina. - M.: GEOTAR-Media, 2008. - http://www.studentlibrary.ru/book/ISBN9785970406137.html
5. Toxicological Chemistry. Situational Problems and Exercises [Electronic resource]: a textbook for students of medical universities / [E. Ya. Borisova et al.]; edited by N. I. Kaletina. - M.: GEOTAR-Media, 2007. - http://www.studentlibrary.ru/book/ISBN9785970405406.html

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – “poor”, 70-79 – “satisfactory”, 80-89 – “good”, 90-100 – “excellent”.

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

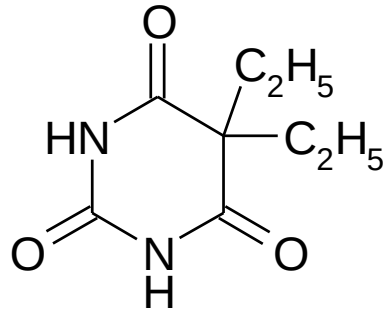
Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during breaks
- Using phone is allowed only during breaks

Example of control No. 1
Toxicological chemistry. Definition.
Mineralization. Definition. Methods.
Zinc. Toxicity. Biological effects. Pharmacokinetics. Reactions.

Example of control No. 2
Chlorophorm. Toxicological significance.
Formaldehyde detection reactions
Dynamics of manifestations of acute intoxication with ethyl alcohol

Example of control No. 3
Forensic chemical examination for "Barbital".



Plan for answer
Toxicological significance (10 points).
Clinic of poisoning (10 points).
Pharmacokinetics and metabolism (10 points).
Physicochemical properties (10 points).
Objects for analysis (5 points).

Isolation. Stages of isolation from biological objects (15 points).
Physicochemical detection methods (10 points).
Chemical detection methods. Color and microcrystalloscopic reactions (20 points).
Quantification methods (10 points).

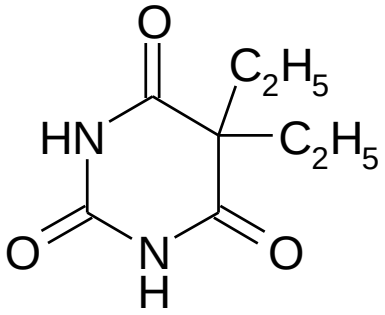
Example of control No. 4

Pesticides. Definition. Classification depending on the purpose. Classification depending on the ways of pesticides penetration into the insect organism.
Organochlorine pesticides (OCPs). Examples. Isolation. Metabolism. Analysis.
Nitric acid. Formula. Physicochemical properties. Toxicological significance. Isolation. Analysis.
Symptoms of carbon monoxide poisoning.

EVALUATION OF THE CONTROL ANSWER
Control work No. 1, 2.
Questions 1 - 2 are evaluated by 33 points (with the step of 5 points).
Questions 3 is evaluated by 34 points (with the step of 5 points).
Total: 2 x 33 + 34 = 100 points.
Control work No. 3
Questions 1 is evaluated by 100 points.
Total: 100 points.
Control work No. 4
Questions 1-4 are evaluated by 25 points.
Total: 25x4=100 points.

Example of exam ticket

№1
Mineralization. Describe the methods of mineralization.
Chlorophorm. Toxicological significance.
Barbiturates. Barbital. Toxicological significance and clinic of poisoning. Pharmacokinetics and metabolism. Physicochemical properties. Isolation. Objects for analysis. Stages of isolation from biological objects. Physicochemical and chemical detection methods. Quantification methods.



Pesticides. Definition. Classification depending on the purpose. Classification depending on the ways of pesticides penetration into the insect organism.

EVALUATION OF EXAM ANSWER

The question card of the exam paper consists of 4 questions.
Questions 1-4 is evaluated by 25 points.
Total: 25x4 = 100 points.

BIOPHARMACY

Teacher: Ass. Prof. Alexandra V. Sitenkova
Building, Department, classroom # Amirkhana str., 16, Institute of Pharmacy, room 421
Contact details:
Telephone number: 521-16-42
E-mail address: aleksandra.sitenkova@kazangmu.ru
Office and working hours: 426 (9-17)
Total hours — 108:
- Lectures 16 hours;
- Practical classes 45 hours;
- Independent work 47 hours

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=3104).

Course objectives: The purpose of mastering the discipline
The goal of mastering the biopharmacy discipline is development of knowledge, skills and practical abilities in the field of production and quality control of medicines, taking into account biopharmaceutical properties.
Tasks of the discipline:
Development of knowledge, skills, and abilities for the purpose of assessing the impact of pharmaceutical factors in the production of drugs.
Development of knowledge, skills, and abilities in conducting biopharmaceutical research when assessing the quality of drugs.

Course topics:
Calendar plan of lectures

1. Biopharmacy. Introduction. Biopharmaceutical Classification System (BCS). Pharmaceutical factors: chemical modification of drugs; physical and chemical state of medicinal substances; excipients, technological processes, type of dosage form, route of administration and method of application.
2. Bioavailability. Absolute and relative biological availability. Basic aspects of pharmacokinetics.
3. Equivalence of drugs.
4. Modern ideas about excipients in the technology of dosage forms from the point of view of biopharmacy. The role of excipients in the creation of dosage forms with the required bioavailability.
5. Factors of the technological impact of the main processes and devices on the bioavailability of drugs.
6. Medicines with improved biopharmaceutical properties. Solid dosage forms
7. Medicines with improved biopharmaceutical properties. Soft dosage forms and liquid dosage forms. transdermal therapeutic systems.
8. Biopharmaceutical evaluation of the quality of various dosage forms. Study of the release and absorption of medicinal substances.

Calendar plan of laboratory classes

1. Topic 1.1. Biopharmacy. Introduction. Biopharmaceutical classification system (BCS). Interview. Solution of situational problems.
2. Topic 1.2. Pharmaceutical factors: chemical modification of drugs; physical and chemical state of medicinal substances; excipients, technological processes, type of dosage form, route of administration and method of application.
3. Topic 1.3. Bioavailability. Absolute and relative bioavailability. Methods for determining bioavailability: pharmacodynamic and pharmacokinetic. Interview. Solution of situational problems.
4. Topic 1.4. Basic aspects of pharmacokinetics. Pharmacokinetic parameters.
5. Topic 1.5. Equivalence of drugs. Methods for determining the equivalence of drugs. Biowaiver procedure
6. Control work on topics 1.1. – 1.5.
7. Control by topics 1.1. - 2.4.
8. Topic 2.1. Modern ideas about excipients in the technology of dosage forms from the point of view of biopharmacy. The role of excipients in the creation of dosage forms with the required bioavailability.
9. Topic 2.2. Factors of the technological impact of the main processes and devices on the bioavailability of drugs.
10. Topic 2.3. Medicines with improved biopharmaceutical properties. Solid dosage forms.
11. Topic 2.4. Medicines with improved biopharmaceutical properties. Soft dosage forms and liquid dosage forms.
12. Topic 2.5. Transdermal therapeutic systems.
13. Topic 2.6. Biopharmaceutical evaluation of the quality of various dosage forms. The study of the release and absorption of medicinal substances. Dissolution test for drug analysis.
14. Control work on topics 2.1. – 2.6.

15. Final lesson

Text books and required supplies:

1. Kharkevitch, D. A. Pharmacology : textbook / D. A. Kharkevitch. - Translation of Russian textbook, 12th edition, revised and improved. - Moscow : GEOTAR-Media, 2023. - 2nd edition. - 680 с. - ISBN 978-5-9704-7088-6. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970470886.html

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of Control by topics 1.1. - 2.4.

Part 1 is MCQ on the portal – 70 points.

Part 2 is theoretical questions.

1. Simple chemical modification of pharmaceutical substances as a pharmaceutical factor. Influence on the bioavailability of the drug (10 points).
2. BCS and BDDS. Methods for determining the permeability of pharmaceutical substances (10 points).
3. Evaluation of the equivalence of drugs in vitro (10 points).

Example of Control by topic 2.1. - 2.6.
Part 1 is MCQ on the portal – 50 points.
Part 2 is theoretical questions.

1. Classification of excipients (10 points)
2. Technological process like pharmaceutical factor. Grinding (10 points).
3. Modified release tablets. Classification (10 points).
4. Dissolution Testing Apparatus. Classification (10 points).
5. Resistance to crushing of tablets. Apparatus (10 points).

SPECIAL PHARMACEUTICAL CHEMISTRY

Teachers: Uliana Zabolotnaya, Daria Gordeeva, Elizaveta Baltaeva
Building, Department, classroom: Institute of Pharmacy, Department of Pharmaceutical chemistry, 419, 421, 433.
Contact details:
Telephone number: +7 (843) 521-16-42 (Guzel Ganieva)
E-mail address: institute.pharmacy@kazangmu.ru
Office and working hours: 201 (9-17, lunch time 12-13)

Total hours: 396 h
-Lectures: 56 h
-Practical classes: 165 h
-Independent work: 139 h
-Control: 36 h

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.

Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University.

Course objectives:

The purpose of mastering the discipline: development of personal qualities in students, formation of universal, general professional and professional competencies in accordance with the requirements of the Federal State Educational Standard of Higher Education. To reveal the methodology of obtaining, quality control, standardization and safety of medicines based on the general laws of basic sciences and in accordance with the applied nature of pharmaceutical chemistry in order to perform professional tasks.

Objectives of mastering the discipline:

Acquisition by students of knowledge about the theoretical foundations of modern pharmaceutical analysis.

Study by students of the analysis of medicines in accordance with their form according to the pharmacopoeial article (PM) or regulatory documentation (RD) and assess their quality based on the results obtained.

Ability to prepare reagents, standard solutions, titrated solutions and analyzed solutions.

Mastering by students the ability to solve a situational professional problem.

Formation in students of practical skills in conducting quality control of a medicine, establishing the authenticity of a medicine based on reactions to their structural fragments.

To develop students' practical skills in determining general quality indicators of medicines: solubility, melting point, density, acidity and alkalinity, transparency, color, ash, loss on drying, etc.

To develop students' practical skills in interpreting the results of UV and IR spectrometry and other physicochemical methods to confirm the identity of medicines; to use various types of chromatography in the analysis of medicines and to interpret the results.

To develop students' practical skills in establishing the quantitative content of medicinal substances in the substance and in dosage forms using titrimetric and physicochemical methods.

To develop practical skills of students in conducting tests for the purity of medicines and their quantitative determination.

Course topics:

Calendar plan of lectures

	4 course VII semester
1	Pharmacopoeia analysis of furan derivatives
2	Pharmacopoeia analysis of benzopyran derivatives. Coumarins and their derivatives. Chromane compounds. Phenylchroman compounds.
3	Pharmacopoeia analysis of indole derivatives. Pharmacopoeia analysis of pyrazole derivatives.
4	Pharmacopoeia analysis of imidazole and imidazoline derivatives and benzymidazole derivatives.
5	Pharmacopoeia analysis of antihistamine drugs. Pharmacopoeia analysis of piperazine derivatives.
6	Pharmacopoeia analysis of pyridine-3-carboxylic acid derivatives and pyridine-4-carboxylic acid.

7	Pharmacopoeia analysis of pyridine methanol derivatives, 2,6-dialkylpyridine derivatives and 1,4-dihydropyridine derivatives
8	Pharmacopoeia analysis of tropane derivatives and ecgonine.
9	Pharmacopoeia analysis of quinoline and quinuclidine derivatives and 8-oxyquinoline derivatives.
10	Pharmacopoeia analysis of benzylisoquinoline derivatives and aporphine.
11	Pharmacopoeia analysis of piperidine and cyclohexane derivatives. Pharmacopoeia analysis of pyrimidine-2,4,6-trione derivatives, pyrimidine-4,6-dione and uracil.
	4 course VIII semester
12	Research methods and methods for obtaining derivatives of 1,2-benzothiazine: piroxicam, benzothiadiazine: hydrochlorothiazide (dichlothiazide), chlorobenzenesulfonic acid: furosemide, bumetanide (bufenox) and pyrimidinothiazole (group B1 vitamins): thiamine, phosphothiamin, cocarboxylase, benfotiamine.
13	Pharmacopoeial analysis of purine derivatives: caffeine, theobromine, theophylline, diprophylline, pentoxifylline, caffeine-sodium benzoate, aminophylline (eufillin), xanthinol. Authenticity, quality indicators, methods of analysis, application, storage.
14	Pharmacopoeial analysis of pterin derivatives: folic acid, methotrexate and isoalloxazine (group B2 vitamins): riboflavin, riboflavin mononucleotide. Authenticity, quality indicators, methods of analysis, application, storage.
15	Pharmacopoeia analysis of phenothiazine derivatives: chlorpromazine (chlorpromazine), promazine (propazine), promethazine (diprazine), levomepromazine (tisercin), trifluoperazine (triftazine), moracizine (ethmozine), ethacizine. Authenticity, quality indicators, methods of analysis, application, storage.
16	Pharmacopoeial analysis of benzodiazepine derivatives: oxazepam (nozepam), phenazepam, nitrazepam, diazepam (sibazon), medazepam (mesapam), chlordiazoepoxide (chlozepid). Authenticity, quality indicators, methods of analysis, application, storage.
	5 course IX semester
17	Topic 2.2. Current status and objectives of quality control in in-pharmacy production of medicines. General methodological techniques in assessing the quality of dosage forms. In-pharmacy quality control of perishable and unstable dosage forms.
18	Topic 2.3. In-pharmacy quality control of concentrated solutions.
19	Topic 2.4. In-pharmacy quality control of alcohol solutions.
20	Topic 2.5. In-pharmacy quality control of hydrochloric acid and its solutions.
21	Topic 2.6. In-pharmacy quality control of liquid dosage forms for internal use containing salts of hydrohalic acids.
22	Topic 2.7. In-pharmacy quality control of liquid dosage forms for internal use containing salts of carboxylic acids.
23	Topic 2.8. In-pharmacy quality control of dosage forms for external use.
24	Topic 2.9. In-pharmacy quality control of eye drops.
25	Topic 2.10. In-pharmacy quality control of injection solutions.
26	Topic 2.11. In-pharmacy quality control of powders containing acetylsalicylic acid, diphenhydramine, barbiturates.
27	Topic 2.12. In-pharmacy quality control of powders with purine and pyrazole derivatives.

28	Topic 2.2. Current status and objectives of quality control in in-pharmacy production of medicines. General methodological techniques in assessing the quality of dosage forms. In-pharmacy quality control of perishable and unstable dosage forms.

Calendar plan of laboratory classes

	4 course VII semester
1	Pharmacopoeia analysis of furan derivatives: nitrofural (furacilin), nitrofurantoin (furadonin), furazolidone, furazidine (furagin). Identification, quality indicators, methods of analysis, application, storage.
2	Pharmacopoeia analysis of benzopyran derivatives. Coumarins and their derivatives: ethylbiscumacetate (neodicumarin), phepromarone, acenocumarol (syncumar). Chromane compounds: tocopherols (vitamins of group E): tocopherol acetate. Phenylchroman compounds: flavonoids (vitamins P): rutoside (rutin), quercetin, dihydroquercetin (dicvertin). Identification, quality indicators, methods of analysis, application, storage.
3	Pharmacopoeia analysis of indole derivatives: reserpine, tryptophan, serotonin, indomethacin, sumatriptan (imigran), tropisetron (navoban), umifenovir (arbidol). Identification, quality indicators, methods of analysis, application, storage.
4	Pharmacopoeia analysis of pyrazole derivatives: phenazone (antipyrine), propiphenazone, metamizole-sodium (analgin), phenylbutazone (butadion). Identification, quality indicators, methods of analysis, application, storage.
5	Pharmacopoeia analysis of imidazole and imidazoline derivatives: pilocarpine, metronidazole, clonidine (clofelin), naphazoline (naphthyzine), xylometazoline (galazoline), clotrimazole and benzymidazole derivatives: bendazole (dibazole), omeprazole. Identification, quality indicators, methods of analysis, application, storage.
6	Colloquium №1
7	Pharmacopoeia analysis of antihistamine drugs: diphenhydramine (diphedrol), chloropyramine (suprastin), ranitidine, famotidine. Pharmacopoeia analysis of piperazine derivatives: cinnarizine. Identification, quality indicators, methods of analysis, application, storage.
8	Pharmacopoeia analysis of pyridine-3-carboxylic acid derivatives: nicotinic acid, nicotinamide, nicotinoyl gamma-aminobutyric acid (picamilon), niketamide (nicotinic acid diethylamide) and pyridine-4-carboxylic acid: isoniazid, ftivazid, nialamide, ethionamide, protionamide. Identification, quality indicators, methods of analysis, application, storage.
9	Pharmacopoeia analysis of pyridine methanol derivatives: pyridoxine, pyridoxal phosphate, 2,6-dialkylpyridine derivatives: pyricarbate (parmidine), emoxypine and 1,4-dihydropyridine derivatives: nifedipine (fenigidine), amlodipine (norvask), nicardipine. Identification, quality indicators, methods of analysis, application, storage.
10	Pharmacopoeia analysis of tropane derivatives: atropine, scopolamine, homatropine, diphenyltropine (tropacin), tropodiphene (tropafen) and ecgonine: cocaine. Identification, quality indicators, methods of analysis, application, storage.
11	Colloquium №2
12	Pharmacopoeia analysis of quinoline and quinuclidine derivatives: quinine, quinidine and their salts, chloroquine (hingamine), hydroxychloroquine (plaquenyl) and 8-oxyquinoline derivatives: quinosol, nitroxoline (5-NOK), chlorhinaldol. Identification, quality

	indicators, methods of analysis, application, storage.
13	Pharmacopoeia analysis of benzylisoquinoline derivatives: papaverine, drotaverine (no-shpa), phenanthrenisoquinoline: morphine, codeine /in the form of base and salt/, ethylmorphine, naltrexone, and aporphine: apomorphine, glaucine. Identification, quality indicators, methods of analysis, application, storage.
14	Pharmacopoeia analysis of piperidine and cyclohexane derivatives: trimeperidine (promedol), fentanyl, loperamide (imodium), trihexyphenidyl (cyclodol), tramadol (tramal). Identification, quality indicators, methods of analysis, application, storage.
15	Pharmacopoeia analysis of pyrimidine-2,4,6-trione derivatives: barbital, barbital-sodium, phenobarbital, benzobarbital (benzonal), hexobarbital-sodium (hexenal), thiopental-sodium, pyrimidine-4,6-dione: primidone (hexamidine) and uracil: fluorouracil, methyluracil, tegafur (fluorafur). Identification, quality indicators, methods of analysis, application, storage.
16	Colloqium №3
17	Testing
	4 course VIII semester
18	Research methods and methods for obtaining derivatives of 1,2-benzothiazine: piroxicam, benzothiadiazine: hydrochlorothiazide (dichlothiazide), chlorobenzenesulfonic acid: furosemide, bumetanide (bufenox) and pyrimidinothiazole (group B1 vitamins): thiamine, phosphothiamin, cocarboxylase, benfotiamine.
19	Pharmacopoeial analysis of purine derivatives: caffeine, theobromine, theophylline, diprophylline, pentoxifylline, caffeine-sodium benzoate, aminophylline (eufillin), xanthinol. Authenticity, quality indicators, methods of analysis, application, storage.
20	Colloquium №4
21	Pharmacopoeial analysis of pterin derivatives: folic acid, methotrexate and isoalloxazine (group B2 vitamins): riboflavin, riboflavin mononucleotide. Authenticity, quality indicators, methods of analysis, application, storage.
22	Pharmacopoeia analysis of phenothiazine derivatives: chlorpromazine (chlorpromazine), promazine (propazine), promethazine (diprazine), levomepromazine (tisercin), trifluoperazine (triftazine), moracizine (ethmozine), ethacizine. Authenticity, quality indicators, methods of analysis, application, storage.
23	Pharmacopoeial analysis of benzodiazepine derivatives: oxazepam (nozepam), phenazepam, nitrazepam, diazepam (sibazon), medazepam (mesapam), chlordiazoepoxide (chlozepid). Authenticity, quality indicators, methods of analysis, application, storage.
24	Colloquium № 5
25	Final test
	5 course IX semester
26	Analysis of perishable and unstable dosage forms of industrial production in the conditions of a pharmaceutical enterprise.
27	Intra-pharmacy control of perishable and unstable dosage forms, purified water. Order 751.
28	Intrapharmacy control of concentrated solutions. Refractometric method of analysis.
29	Intrapharmacy control of alcohol solutions.
30	Control № 1 on topics 9.1-9.4

31	Hydrochloric acid and its solutions. Intra-pharmaceutical quality control of liquid dosage forms for internal use containing salts of hydrohalic acids.
32	Intra-pharmacy quality control of liquid dosage forms for internal use containing salts of hydrohalic acids
33	Intra-pharmacy quality control of liquid dosage forms for internal use containing salts of carboxylic acids.
34	Intra-pharmacy quality control of dosage forms for external use.
35	Intrapharmacy quality control of eye drops.
36	Control №2 on topics 9.5-9.8.
37	Intra-pharmacy quality control of injection solutions.
38	Intra-pharmacy quality control of powders containing acetylsalicylic acid, diphenhydramine, barbiturates.
39	Intrapharmacy quality control of powders with purine and pyrazole derivatives.
40	Intrapharmacy quality control of powders with vitamins.
41	Control №3 on topics 9.9-9.12.
42	Practical skills. Final test

Text books and required supplies:

2. State Pharmacopoeia of the Russian Federation XV edition (https://pharmacopoeia.regmed.ru/pharmacopoeia/izdanie-15/).
3. Medine is a medical abstract and bibliographic database/search system. The PubMed system provides access to Medine. PubMed documents medical and biological articles from specialized literature, and also provides links to full-text articles if they are available on the Internet. Pubmed contains abstracts from the following areas: medicine, dentistry, general health care, psychology, biology, genetics, biochemistry, cytology, biotechnology.
4. Legal reference system "Consultant Plus" (cooperation agreement dated 07.06.2002). Access from library computers.
5. Scientific Electronic Library eLIBRARY.RU (http://elibrary.ru/)
6. Pharmaceutical chemistry : textbook / ed. G. V. Ramenskaya. - Moscow : GEOTAR-Media, 2023. - 384 c. - ISBN 978-5-9704-7240-8, DOI: 10.33029/9704-7240-8-PCH-2023-1-384.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquium/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in

other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral, questions with full answer or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of module № 1.

Umifenovir. Clotrimazole. Present the characterization of pharmaceutical substances in accordance with the algoritm.

Algorithm for pharmaceutical substance characterization:

1. Latin name (1p.), chemical formula (1p.)
2. Definition/Chemical name (3p.)
3. Characters/Appearance (1p.), solubility (1p.)
4. Scheme of PhS synthesis/receiving (4p.)
5. Functional groups (2p.)
6. Identification/Instrumental methods (3p.), reactions (12p.)
7. Related substances/ Tests for purity (2p.)
8. Quantitative analysis/ Titration methods (their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer) (12p.), Instrumental methods (3p.)
9. Storage conditions due to physical and chemical properties and influence of external environment (2p.)
10. Medical use, dosage forms (3p.)

Example of module № 2.

Diphenhydramine hydrochloride. Atropine sulfate. Present the characterization of pharmaceutical substances in accordance with the algoritm.
Algorithm for pharmaceutical substance characterization:
1. Latin name (1p.), chemical formula (1p.)
2. Definition/Chemical name (3p.)
3. Characters/Appearance (1p.), solubility (1p.)
4. Scheme of PhS synthesis/receiving (4p.)
5. Functional groups (2p.)
6. Identification/Instrumental methods (3p.), reactions (12p.)
7. Related substances/ Tests for purity (2p.)
8. Quantitative analysis/ Titration methods (their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer) (12p.), Instrumental methods (3p.)
9. Storage conditions due to physical and chemical properties and influence of external environment (2p.)
10. Medical use, dosage forms (3p.)

Example of module № 3.
Quinine sulfate. Glaucine. Present the characterization of pharmaceutical substances in accordance with the algoritm.
Algorithm for pharmaceutical substance characterization:
1. Latin name (1p.), chemical formula (1p.)
2. Chemical name (4p.)
3. Functional groups (2p.)
4. Scheme of PhS synthesis (5p.)
5. Description, solubility (3p.)
6. Qualitative analysis (12p.)
7. Tests for purity (4p.)
8. Methods of quantitative determination, their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer (12p.)
9. Storage conditions due to physical and chemical properties and influence of external environment (4p.)
10. Medical use, dosage forms (2p.)

Example of module № 4.
Hydrochlorothiazide. Caffeine. Present the characterization of pharmaceutical substances in accordance with the algoritm.
Algorithm for pharmaceutical substance characterization:
1. Latin name (1p.), chemical formula (1p.)
2. Chemical name (4p.)
3. Functional groups (2p.)
4. Scheme of PhS synthesis (5p.)
5. Description, solubility (3p.)
6. Qualitative analysis (12p.)
7. Tests for purity (4p.)

8. Methods of quantitative determination, their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer (12p.)
9. Storage conditions due to physical and chemical properties and influence of external environment (4p.)
10. Medical use, dosage forms (2p.)

Example of module № 5.

Ethacizine. Oxazepam. Present the characterization of pharmaceutical substances in accordance with the algoritm.

Algorithm for pharmaceutical substance characterization:
1. Latin name (1p.), chemical formula (1p.)
2. Chemical name (4p.)
3. Functional groups (2p.)
4. Scheme of PhS synthesis (5p.)
5. Description, solubility (3p.)
6. Qualitative analysis (12p.)
7. Tests for purity (4p.)
8. Methods of quantitative determination, their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer (12p.)
9. Storage conditions due to physical and chemical properties and influence of external environment (4p.)
10. Medical use, dosage forms (2p.)

Example of module № 6.

Carry out organoleptic and chemical controls of the liquid dosage forms:

Rp.: Natrii bromidi 4,0
Aquae purificatae 200,0
M.D.S. For internal use.

Rp.: Infusi herbae Thermopsidis 0,3 % - 100,0
Natrii bicarbonatis
Natrii benzoatis ana 4,0
M.D.S. 1 tablespoon three times a day

Rp.: Spiritus aethylicus 95% - 50,0
D.S. For wounds treatment

Example of module № 7.

Carry out organoleptic and chemical controls of the dosage forms:

Rp.: Streptocodi 0.2
Vaselini 20.0
M.D.S. Apply to skin

Rp.: Sol. Collargoli 1% - 10.0
M.D.S. Intranasal drops

Example of module № 8.

Carry out organoleptic and chemical controls of the dosage forms:

Rp.: Sol. Natrii hydrocarbonatis 7% - 100.0
M.D.S. For injections.

Rp.: Acidi ascorbinici 0.12
Acidi nicotinici 0.07
M.f.p.
D.t.d. N 10
S. 1 powder per a day.

EVALUATION OF THE MODULE ANSWER

The question card of the module 1 and 2 consists of 2 tasks (pharmaceutical substances) and algorithm of the answer.

According to the algorithm for the answering questions are evaluated from 1 to 12 points:

Correct characterizing of 'Latin name', 'Chemical formula', 'Appearance', 'Solubility' is evaluated by 1 point;

Correct characterizing of 'Functional groups', 'Test for purity', 'Storage conditions' is evaluated by 2 points;

Correct characterizing of 'Chemical name', 'Instrumental methods', 'Medical use, dosage forms' is evaluated by 3 points;

Correct characterizing of 'Scheme of PhS synthesis' is evaluated by 4 points;

Correct characterizing of 'Identification reactions', 'Quantitative analysis' is evaluated by 12 points;

Total: 1+1+3+1+1+4+2+3+12+2+12+3+2+3 = 50 points for characterizing 1 pharmaceutical substance.

Ticket contains 2 pharmaceutical substances, consequently total for the ticket: 50*2 = 100 points.

The question card of the module 3 - 5 consists of 2 tasks (pharmaceutical substances) and algorithm of the answer.

According to the algorithm for the answering questions are evaluated from 1 to 12 points:

Correct characterizing of 'Latin name', 'Chemical formula' is evaluated by 1 point;

Correct characterizing of 'Functional groups', 'Medical use, dosage forms' is evaluated by 2 points;

Correct characterizing of 'Description, solubility' is evaluated by 3 points;

Correct characterizing of 'Chemical name', 'Tests for purity, 'Storage conditions' is evaluated by 4 points;

Correct characterizing of 'Scheme of PhS synthesis' is evaluated by 5 points;

Correct characterizing of 'Qualitative analysis', 'Methods of quantitative determination' is evaluated by 12 points;

Total: 1+1+4+2+5+3+12+4+12+4+2 = 50 points for characterizing 1 pharmaceutical substance.

Ticket contains 2 pharmaceutical substances, consequently total for the ticket: 50*2 = 100 points.

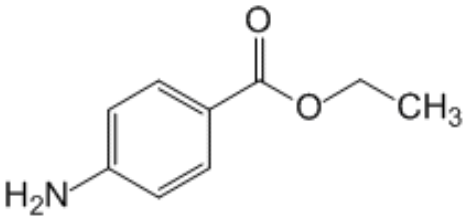
The question card of the module 6 consists of 3 questions.

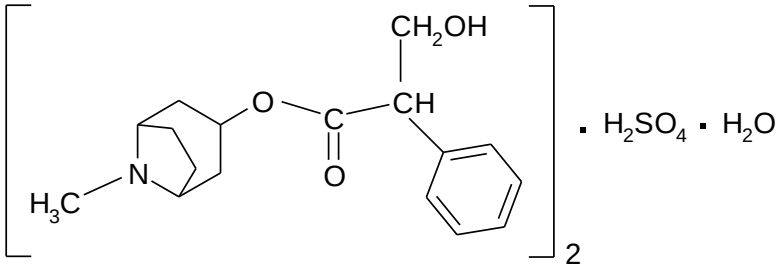
1,2 questions are for 40 points

3d question is for 20 points.

Total: 40x2+20=100.

The question card of the module 7,8 consists of 2 questions, each question is for 50 points.
Total: 50+50=100.
EXAMPLE OF EXAM TICKET
Benzocaine. Present the characterization of pharmaceutical substances in accordance with the algorithm
Atropine sulfate. Present the characterization of medicinal substances in accordance with the algorithm





Algorithm for pharmaceutical substance characterization:

Latin name, chemical formula
Functional groups
Qualitative analysis
Methods of quantitative determination, their justification, chemistry of reactions, titration conditions, indicator, equivalence factor, calculation formulas for mass fraction, titer
Medical use, dosage forms

Recipe: Sol. Zinci sulfatis 0.5% – 10.0
Acidi borici 0.2
Misce. Da. Signa. By 2 drops 3 times a day to each eye.

Carry out organoleptic and chemical controls of the dosage form

EVALUATION OF THE EXAM ANSWER
The question card of the exam paper consists of 3 questions.
Questions 3 is evaluated by 20 points.
Questions 1-2 are evaluated by 40 points.
Total: 10 + (2 x 40) = 100 points.

SPECIAL PHARMACEUTICAL TECHNOLOGY

Teachers: Ass.Prof. Svetlana Kamaeva
Building, Department, classroom: Amirkhana, 16, Department of Pharmaceutical Technology, 408, 404
Contact details:
Telephone number: 89600801619 (Kamaeva Svetlana)

E-mail address: farm64@bk.ru
Office and working hours: 409 (8-18)

Class hours: 4 course 216 + 5 course 180 (total 396)
Course: 4, 5
Term (Semester): 7, 8, 9
Lectures 60 hours.
Practical exercises 160 hours.
Independent work of 140 hours.
Exam 9 semester (36 hours)
Total 396 hours.
Total Credit units of labor (ZET) 11

Educational time in VII term:
Lectures 18 hours (9 lectures)
Lessons 45 hours (9 lessons x 5 hours)
Independent work of 45 hours

Educational time in VIII term:
Lectures 18 hours (9 lectures)
Lessons 45 hours (9 lessons x 5 hours)
Independent work 45 hours
Credit units of labor input during 4 course - (ZET) 6

Educational time in IX term:
Lectures 24 hours (12 lectures)
Lessons 70 hours (14 lessons x 5 hours)
Independent work of 50 hours
Exam 9 semester (36 hours)

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Laboratory practical classes and training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher. Also they contain experimental scientific research activities. It requires the use of special equipment, facilities and materials in classroom. This kind of training to be held in teaching laboratories.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (http://e.kazangmu.ru/course/view.php?id=2266
https://e.kazangmu.ru/course/view.php?id=2572
https://e.kazangmu.ru/course/view.php?id=3172).

Course objectives:

Main goal of mastering the discipline is the formation of systemic knowledge, skills in the development and manufacture of medicines and drugs in various dosage forms, as well as the organization of pharmaceutical production, pharmacies, small, medium and large enterprises.

Pharmaceutical technology studies state regulation of drug production, solid, liquid and soft dosage forms, sterile and aseptic manufactured dosage forms, herbal preparations, alternative dosage forms, general principles for organizing the production of finished drugs; standardization of herbal, natural and chemical drugs according to GMP requirements; organization of development and improvement of technologies for the production of solid, soft and liquid dosage forms in the conditions of industrial, small-scale production, sterile and aseptically manufactured dosage forms, herbal preparations, non-traditional dosage forms. Pharmaceutical technology interconnects the various stages of development and the laws of a general and private nature when receiving medicines: therapeutic, prophylactic, rehabilitation, diagnostic, homeopathic, veterinary and cosmetic preparations. Pharmaceutical technology regulates the quality assurance of medicines, taking into account pharmaceutical factors and bioavailability, carries out licensing and certification of medicines, compilation of permissive regulatory documentation (Pharmacopoeia, Federal Standards, industrial regulations), taking into account current legislative documents.

Special Pharmaceutical technology studies the production of solid, liquid and soft dosage forms, sterile and aseptically manufactured dosage forms under conditions of pharmaceutical factory and in bigger production conditions.

Tasks of the discipline:

The challenges of pharmaceutical technology as specialized academic disciplines are:

teaching students the activities of a pharmacist based on the study

of the theoretical laws of the processes for obtaining and converting drugs and excipients into dosage forms;

the formation of students' practical knowledge, skills and abilities

of manufacturing medicines, as well as assessing the quality of raw materials, intermediates and finished medicines;

developing students' ability to choose the most effective and rational medicines and therapeutic systems based on the modern biopharmaceutical concept adopted in world practice, as well as on the development of the technology of selected dosage forms and standardizing documentation for them.

Course topics: VII term

Calendar plan of lectures

1 State regulation of the production of dosage forms. The main processes and equipment of pharmaceutical technology in the production of dosage forms. Mechanisms of transmission in factories. Basic concepts of machines and devices. Moving materials

1. inside production. Material balance of production
2. 2 Grinding of solid materials. Equipment. Classification of bulk materials. Production of preparations and powders in the
3. pharmaceutical enterprises. Private technology.

2 Solid dosage forms for internal and external use. The main processes and equipment of pharmaceutical technology in the production of solid dosage forms. Classification of bulk materials. Manufacture of tablets by direct compression. Influence of technological characteristics of pressed materials on the possibility of using direct pressing. Tablet machines. Determination of physicochemical and technological characteristics of bulk materials. Manufacture of tablets by direct compression. Influence of technological characteristics of pressed materials on the possibility of application

4. direct pressing. Tablet machines.

3 Solid dosage forms for internal and external use. The main processes and equipment of pharmaceutical technology in the production of solid dosage forms. Wet granulation. The value of the process and its types. Used equipment. Dry granulation. The value of the process and its types. Used equipment. Technological schemes of production. Coating of tablets with coated and pressed shells. Film coating of tablets. Trituration

5. tablets.

4 Packing and packaging of tablets. Tablets with Prolonged release. Technological schemes of production. Ways to improve, prospects for the development of tablets as a dosage form. Evaluation of the quality of tablets.

5 Granules. Dragee. Technological schemes of production. Quality control. Capsules. Microcapsules. Receiving methods. Dosage forms with microcapsules.

6 Prospects for the creation of dosage forms of new generations. Nanotechnologies. Prospects for the use of nanotechnology in medicine and pharmacy. Problems of safety in the use of nanotechnologies and nanoproducts. Innovative dosage forms. Magnetic systems.

7 Pastilles. Medicinal Chewing gums. Medicinal sponges. Implants. Lollipops. Lyophilizates. Foam. Tiles. Therapeutic systems. Medicinal tampons. Medicinal shampoos.

8 Alcohol solutions. Ethyl alcohol as a solvent and extractant. Dilution and strengthening

a. Of Alcohol solutions. Determination of the concentration of alcohol solutions

Calendar plan of laboratory classes

1. State rationing of the production of medicinal preparations. The main processes and equipment of pharmaceutical technology in the production of solid dosage forms. Material balance
2. Grinding of solid materials. Apparatus. Classification of bulk materials. Physical, chemical and technological properties of bulk materials. Determination of physical, chemical and technological characteristics of bulk materials. Production of collections and powders in the conditions of pharmaceutical enterprises. Private technology.
3. Solid dosage forms for internal and external applications. The main processes and equipment of the pharmaceutical technologies for the production of solid dosage forms. Classification of bulk materials. Manufacture of tablets by direct compression. Influence of technological characteristics of pressed materials on the possibility of using direct pressing. Tablet machines. Determination of physicochemical and technological characteristics of bulk materials. Manufacture of tablets by direct compression. Influence of technological characteristics of pressed materials on the possibility of using direct pressing. Tablet machines. Solid dosage forms for internal and external use. The main processes and

equipment of pharmaceutical technology in the production of solid dosage forms. Wet granulation. The value of the process and its types. Used equipment. Dry granulation. The value of the process and its types. Used equipment.

4. Coating of tablets with coated and pressed shells. Film coating of tablets. Trituration tablets. Packing and packaging of tablets. Prolonged action tablets. Technological schemes of production. Packing and packaging of tablets. Ways of improvement, prospects for the development of tablets as a dosage form. Evaluation of the quality of tablets.
5. Granules. Dragee. Technological schemes of production. Quality control. Capsules. Microcapsules. Methods receipt. Dosage forms with microcapsules.
6. Control work 1
7. Prospects for the creation of dosage forms of new generations. Nanotechnologies. Prospects for the use of nanotechnology in medicine and pharmacy. Problems of safety in the use of nanotechnologies and nanoproducts. Innovative dosage forms. Magnetic systems. Pastilles. Chewing gum medicinal. Medicinal sponges. Implants. Lollipops. Lyophilizates. Foam. Tiles. Therapeutic systems. Medicinal tampons. Medicinal shampoos.
8. Ethyl alcohol as a solvent and extractant. Dilution and strengthening of alcohol solutions. Definitionof concentration of alcohol solutions with a glass alcohol meter. Cases solving.
9. Ethyl alcohol as a solvent and extractant. Dilution and strengthening of alcohol solutions. Definition of concentration of alcohol solutions with a glass alcohol meter. Cases solving. Control work 2

Course topics: VIII term

Plan of lectures on general pharmaceutical technology for the VIII semester

1 Production of ointments in the conditions of large pharmaceutical enterprises. Ointment bases and excipients in the production of ointments. Evaluation of the quality of ointments. Improving the production of ointments. Liniments. Suspensions and emulsions in the pharmaceutical industry. Characteristic. Technological schemes of production. Equipment.

2 Production of rectal and vaginal dosage forms. Technological schemes of production. Used equipment. Quality control. Medical pencils.

3 Soft dosage forms. Application medicines. Plasters. germicidal paper. transdermal therapeutic systems. Approved systems. Mustard plasters.

4 Aerosols

5 GMP rules. Dosage forms for parenteral administration. Production of water for injection. Equipment for obtaining water for injection in the conditions of pharmaceutical enterprises.

6 Technological scheme for the production of injection solutions. Making ampoules. Assessment of the quality of solutions in ampoules. The problem of complex mechanization and automation of ampoule production. Ways of stabilization of injection solutions in ampoules. Stabilizers. Gas and steam protection. Microbiological methods of stabilization. preservatives. Glass for ampoules, its composition, classes. Checking the chemical and thermal resistance of ampoule glass. Production of aqueous solutions for injection in ampoules that require stabilization, special purification, and also without stabilizers and without thermal stabilization. Production of oil solutions in ampoules.

7 Ophthalmic medicinal forms in industrial conditions. Production of eye medicinal forms in conditions pharmaceutical enterprises. Technological schemes. Ophthalmic dosage forms: eye drops, ointments, films, eye inserts

8 Containers and packaging in the production of medicines
9 Prospects for the creation of dosage forms of new generations

Lesson plan on general pharmaceutical technology for the VIII semester

1 Production of ointments in the conditions of large pharmaceutical enterprises. Ointment bases and excipients in the production of ointments. Evaluation of the quality of ointments. Improving the production of ointments. Liniments. Suspensions and emulsions in the pharmaceutical industry. Characteristic. Technological schemes of production. Equipment.

2 Production of rectal and vaginal dosage forms. Technological schemes of production. Used equipment. Quality control. Medical pencils.

3 Soft dosage forms. Application medicines. Plasters, germicidal paper. transdermal therapeutic systems. Mustard plasters.

4 Aerosols

5 Module 3

6 GMP rules. Dosage forms for parenteral administration. Production of water for injection. Equipment. Technological scheme for the production of injection solutions. Making ampoules. Assessment of the quality of solutions in ampoules. The problem of complex mechanization and automation of ampoule production. Ways of stabilization of injection solutions in ampoules. Stabilizers. Gas and steam protection. Microbiological methods of stabilization. preservatives. Glass for ampoules, its composition, classes. Checking the chemical and thermal resistance of ampoule glass. Production of aqueous solutions for injection in ampoules that require stabilization, special purification, and also without stabilizers and without thermal stabilization. Production of oil solutions in ampoules.

7 Ophthalmic medicinal forms in industrial conditions. Production of eye medicinal forms in conditions ща pharmaceutical enterprises. Technological schemes. Ophthalmic dosage forms: eye drops, ointments, films, eye inserts

8 Control work 4

9 Certification of practical skills

IX term

Plan of LECTURES

1 Technology of Powders
2 Technology of liquid dosage forms
3 Technology of liquid dosage forms
4 Technology of soft dosage forms
5 Stabilization of heterogeneous systems
6 Stabilization of injection solutions and eye drops
7 Vaginal dosage forms and therapeutic systems
8 Rectal dosage forms and therapeutic systems
9 Ophthalmic medicinal forms and therapeutic systems
10 Dermatological dosage forms and therapeutic delivery systems
11 Age-related drugs and inhaled drug delivery routes
12 Pharmaceutical incompatibilities

PLAN OF LESSONS

1 Author's recipes: powder technology
2 Author's prescriptions: technology of liquid dosage forms
3 Author's prescriptions: technology of soft dosage forms
4 Stabilization of heterogeneous systems
5 Stabilization of injection solutions and eye drops
6 CONTROL WORK 5
7 Vaginal and rectal dosage forms and therapeutic systems
8 Ophthalmic medicinal formsand therapeutic systems
9 Dermatological dosage forms and therapeutic delivery systems
10 Age-related drugs and dosage forms for inhalation drug delivery routes
11 Pharmaceutical incompatibilities
12 CONTROL WORK 6
13 Certification of practical skills
14 Final test

Text books and required supplies:

1.Pharmaceutical technology. Technology of dosage forms : a textbook for students of higher educational institutions / I. I. Krasnyuk, S. A. Valevko, T. V. Mikhailova [et al.] ; ed. I. I. Krasnyuk, G. V. Mikhailova. – 3rd ed., revised and additional – Moscow : Publishing center «Academy», 2007. – 592 p.

List of additional literature

1. Pharmaceutical technology. Technology of dosage forms : hands to pract. Occupations : textbook. allowance / I. M. Krasnyuk [et al.]. – Moscow : GEOTAR-Media, 2012. – 544 p.
2. Federal Law «On the Circulation of Medicines» dated 12.04.2010 N 61-FZ.
3. Order of the Ministry of Health of the Russian Federation of 2023 No. 249n «On approval of the rules for the manufacture and dispensing of drugs for medical use by pharmacy organizations, individual entrepreneurs licensed for pharmaceutical activity».

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”.

Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is

given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of module No. 1.
Ticket 1
Features of crushing of solids. Factors affecting the degree of grinding.
Granules: general characteristics as a dosage form; improvement of manufacturing technology and types of packaging.
Technological scheme for the production of powders.
When standardizing finished tablets, the abrasion test gave the following results: the weight of the tablets before abrasion was $8.350 \cdot 10^{-3}$ kg, the weight of the tablets after abrasion was $6.954 \cdot 10^{-3}$ kg. What is the abrasion strength of the tablets? Make a conclusion about the quality of the tablets (in case of non-compliance, indicate the possible reasons).
Consumption coefficient 1.03. Make up the consumption rates for obtaining 1 kg of sulfadimezin tablets, if the composition of one tablet:
Sulfadimezin 0.25
Starch 0.067
Calcium stearate 0.003

EVALUATION OF THE MODULE ANSWER
On each lesson students have the mark for work. In Module 1 5 classes
Total for classes 5x10= 50 points
On Module 1 students have 5 theoretical questions, each task is evaluated by 10 points.
Total: 5 x 10 = 50 points
Total for Module 1 100 points

Example of module No. 2
Ticket 2

1. According to the readings of the densimeter 0.81000, determine the alcohol content in percent by volume in alcohol-water mixture at a temperature of + 18 ° C.
2. The density of the aqueous-alcoholic solution is 0.8535 at -6 °C. How many kg of water and this alcohol will you need to take to make 540kg of 50% alcohol. Make an alcohol account.
3. Get 5.5 kg of 60% alcohol from the available 96%. Find contraction.

EVALUATION OF THE MODULE ANSWER
On each lesson students have the mark for practical work. In Module 2 2 classes
Total for classes 2x10= 20 points
On Module 2 students have in classroom 20 tests on Educational portal – 20 points.
On Module 2 students have 3 theoretical questions, each task is evaluated by 20 points.
Total: 2 x 30 = 60 points
Total for Module 2 100 points

Example of module No. 3
Control work - Example of task

Ticket number 1
Requirements for ointment bases. Characteristics of hydrophilic ointment bases.
The device and principle of operation of the apparatus used in production of suppositories.
Transdermal therapeutic systems. Their characteristics, classification. Ways to obtain.
Technological scheme for the production of mustard plasters. Quality control.

EVALUATION OF THE MODULE ANSWER
On each lesson students have the mark for practical work. In Module 3 4 classes
Total for classes 4x10= 40 points
On Module 3 students have in classroom 20 tests on Educational portal – 20 points.
On Module 3 students have 4 theoretical questions, each task is evaluated by 10 points.
Total: 4 x 10 = 40 points
Total for Module 3 100 points

Example of module No. 4
CONTROL WORK

Example of Ticket

Ticket number 1
1.General characteristics of solutions for injection. Advantages and disadvantages of solutions for injections.
2.Basic requirements for solutions for injections.
3.Features of the technology and technological scheme of production solution for injections of Dibasoli 1%.

EVALUATION OF THE MODULE ANSWER

On each lesson students have the mark for practical work. In Module 4 2 classes
Total for classes 2x10= 20 points
On Module 4 students have in classroom 20 tests on Educational portal – 20 points.
On Module 4 students have 3 theoretical questions, each task is evaluated by 20 points.
Total: 3 x 20 = 60 points
Total for Module 4 100 points
MODULE 5
Ticket number 1
You must write characterization of drug form, theoretical foundation of technology, calculations, technology of drug form, Passport of written control (PWC), it's back side, packaging, label and storage of drug form.
1.Rp.: Acidi acethylsalicylici 0,15
Dimedroli 0,05
Acid iascorbinici 0,2
Misce fiat pulvis
Da tales doses N. 30
Signa. For 1 powder 2 times a day orally
2. Recipe: Solutionis Natrii hydrocarbonatis 4%-200,0
Natrii bensoatis 1,0
Natrii salicylatis 2,0
Glucosi 10,0
Liquoris Ammonii anisati 8,0
Misce. Da. Signa. By 1 tablespoon 2 times a day

3.Recipe: Streptocidi 6,0
Solutionis Acidi borici 1% -200,0
Misce. Da. Signa. Lotion for skin

EVALUATION OF THE MODULE ANSWER
On each lesson students have the mark for practical work. In Module 5 5 classes
Total for classes 5x10= 50 points
On Module 5 students have in classroom 20 tests on Educational portal – 20 points.
On Module 5 students have 3 theoretical questions, each task is evaluated by 10 points.
Total: 3 x 10 = 30 points
Total for Module 5 100 points

MODULE 6
Ticket number 1
You must write characterization of drug form, theoretical foundation of technology, calculations, the technology of drug form, Passport of written control (PWC), it's back side, packaging, label and storage of drug form.
1.Rp.: Mentholi 0,1
Novocaini 1,5
Dermatoli 0,5
Vaselini 30,0

Lanolini 15,0
Misce fiat unguentum
Da. Signa. To spread under the bandage

2.Rp.: Dermatoli 0,2
Zinci oxydi 0,1
Olei Cacao quantum satis ut fiant suppositoria rectalia
Da tales doses numero 10
Signa. By 1 suppositorium 1 time a day per rectum
3. Calculate on equivalents of sodium chloride:
Recipe: Solutio Acidi nicotinici 0,2% -20.0
Sodium chloride as required to get
isotonic solution
Sterilize!
Da. Signa. By 2 drops 2 times a day in the left eye

EVALUATION OF THE MODULE ANSWER
On each lesson students have the mark for practical work. In Module 6 5 classes
Total for classes 5x10= 50 points
On Module 5 students have in classroom 20 tests on Educational portal – 20 points.
On Module 5 students have 3 theoretical questions, each task is evaluated by 10 points.
Total: 3 x 10 = 30 points
Total for Module 5 100 points
In IX term must be course work.

Examples of Themes of course work:
1. Technology of ophthalmic medicinal films.
2. Technology of solutions for injections and infusions.
3. Capsules as a dosage form, it's technology and assortment.
4. Methods of sterilization used in the technology of finished dosage forms.
5. Microencapsulated drugs, technology of microencapsulation.
6. Technology of ointments in industrial production.
7. Technology of Tinctures on pharmaceutical factory.
8. Aerosol as a dosage forms, their technology, modern propellants in aerosol production.
9. Technology of flavoring and medicinal syrups.
10. Tablets as a dosage form: technology and assortment.

EVALUATION OF THE COURSE WORK
Is conducted according to accepted in Kazan State Medical University rating system.
90-100 points - excellent,
80-89 points - well, good
70-79 points - satisfactory,
69 points or less - unsatisfactory.

EXAM

EXAM have 2 stages:

Stage 1 – level 1 – assessment of knowledge + Level 2 - assessment of proficiency

Stage 2 - Level 3 skill assessment

Example for Ticket for STAGE 1

Kazan State Medical University
of the Ministry of Health of the Russian Federation
Institute of Pharmacy
Pharmaceutical Technology

Ticket number 1
Level 1 - knowledge assessment
1. Give an answer to the theoretical question:
1. Material balance. Material balance equation. Technological output, technological waste, consumption coefficient: how to calculate them. Present material balance in the form of a table for this case: When grinding 50 kg of streptocidum in a ball mill, 49 kg of crushed product was obtained. Find the exit, waste and consumption coefficient.

10 points

2.Level 2 assessment of proficiency - solving situational cases (Each case is estimated at 10 points).
The situational case is described according to the following algorithm:
write the prescription in Latin;
determine the type of dosage form;
make a pharmaceutical analysis (control doses if necessary etc.);
make the necessary calculations;
describe the theoretical points of technology of the drug;
describe the type of packaging of the medicinal product and design of the label for dispensing;
describe the technology of the medicinal product according to the individual prescription;
set the quality criteria for the manufactured product;
write the passport of written control;
set the expiration date of the manufactured product.

Recipe: Infusi rhizomatis cum radicibusValerianae ex 10,0 – 100,0
Natrii bromidi 0,5
Coffeini- natrii bensoatis 0,4
Misce. Da. Signa. By 1 tablespoon 3 times a day orally
3. Calculate on equivalents of sodium chloride:
Recipe: Solutionis Dimedroli1% -10.0
Sodium chloride as required to get
isotonic solution
Sterilize!
Da. Signa. By 2 drops 2 times a day in the left eye

4. Find the density of an alcohol-water solution containing 29.3% (by volume) alcohol and located at a temperature of +22°C.

5.How much 95% alcohol and water will be required to get 375 kg of 40% alcohol? What volume of anhydrous alcohol at 20 ºC is contained in the resulting solution?

Note: The maximum number of points for answering on a ticket is 50 points (5 questions x 10 points = 50)

level 3 - certification of practical skills - maximum 50 points

EXAMPLE of cases on practical skills

Case № 1

1.The pharmacy received a prescription for the manufacture of a medicinal product according to the prescription:

Recipe: Unguenti Streptocidi 1%-10,0

Da. Signa. To spread on the injured skin

Prepare the drug form, package and label it

Check list
For evaluation of skills in pharmaceutical technology
at the stage of certification of practical skills
Name of student_____

No.	Practical skill	Criteria for evaluation	Points
1	Using pharmaceutical technology reference material	Did not use reference material	0
		Used reference material, but does not know it	6
		Does not work well with reference material	7
		Made inaccuracies in the use of reference data	8
		did everything, but made minor inaccuracies that did not affect the quality of the drug	9
		did everything right	10
2	Practical skills in conducting the technological process	Did not get to work	0
		Started to work, but does not focus on the workplace, does not give the correct answer	6
		It works unsatisfactorily (demonstrated incorrect practical skills in manufacturing drug form, made gross errors in the answer)	7
		He did not perform all the necessary actions, and with errors (incorrectly holds the scales, did not handle the bar, etc.)	8
		did everything, but made minor inaccuracies that did not affect the quality of the drug (wiped the bar with cotton wool, etc.)	9
		did everything right	10
3	The theoretical justification of the technology of the dosage form	Did not proceed to answer	0
		Proceeded to answer, but does not give the correct answer	6
		did not give a theoretical justification; made gross errors in the answer	7
		Gave a theoretical justification, but with errors	8
		Gave a theoretical justification, but made small inaccuracies that do not affect the quality of the drug	9
		did everything right	10
4	Packaging and labeling	did not proceed to design drug form	0
		started to make a label, but does not give the correct answer	6
		incorrectly label for vacation, made gross errors in the answer	7
		Has not done all the necessary actions, but with obvious errors	8
		did everything, but made minor inaccuracies that did not affect the quality of the drug	9
		did everything right	10
5	PWC, calculations	student did not proceed to the design of the PWC	0
		I started to draw up the PPC, but does not navigate in the calculations, the design of the PPC, does not give the correct answer	6
		Incorrectly issued PPK, made gross errors in the calculations	7

		Has not done all the necessary actions, but with obvious errors	8
		did everything, but made minor inaccuracies that did not affect the quality of the drug	9
		did everything right	10
TOTAL points for certification of practical skills on special pharmaceutical technology			50

Total mark_____

The final mark for the exam is 100 points (50 points for stage 1 for ticket + 50 points for stage 2 practical skills).

Final Certification is conducted according to accepted in Kazan State Medical University rating system.
90-100 points - excellent,
80-89 points - well, good
70-79 points - satisfactory,
69 points or less - unsatisfactory.

CLINICAL PHARMACOLOGY

Teachers: PhD R.R.Kamaliev
Building, Department, classroom: educational building, 16 Amirkhana Ave, 3rd floor, room No 315, 310, 308
Contact details:
Telephone number: +79503224468
E-mail address: rafis.kamaliev@kazangmu.ru
Office and working hours: Mon-Sat 9-15

Total hours — 324:
- Lectures 40 hours;
- Practical classes 132 hours;
- Independent work 116 hours;
- Control 36 hours

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=454).

Course objectives: The purpose of mastering the discipline

Tasks of the discipline:

Knowledge formation:

- classification and basic characteristics of drugs;
- pharmacodynamics and pharmacokinetics;
- indications and contraindications to the use of medicines;
- side effects;
- general principles of prescriptions of medicines.

Development of skills:

- analyze the effect of medicines according to the totality of their pharmacological effects and the possibility of their use for therapeutic treatment;
- write prescriptions for medicines in certain diseases and pathological processes, based on the features of their pharmacodynamics and pharmacokinetics.

Formation of skills:

- prescribing medicines in the treatment of various diseases and pathological processes in the adult population.

Course topics:

The course is focused on the study of general principles and regularities of pharmacology, specific features of the action of drugs and preparations belonging to different pharmacological groups (classification, mechanisms of action, pharmacological effects, indications and contraindications for use, side effects of drugs).

Thematic plan of lectures

the 7h semester

1. Development & Regulation of Drugs
2. Nitric Oxide
3. Drugs of Abuse
4. Agents Used in Anemias; Hematopoietic Growth Factors
5. 42. Agents That Affect Bone Mineral Homeostasis

the 8th semester

1. Hypothalamic & Pituitary Hormones
2. 39. Adrenocorticosteroids & Adrenocortical Antagonists
3. 40. The Gonadal Hormones & Inhibitors
4. 42. Agents That Affect Bone Mineral Homeostasis
5. 49. Antiviral Agents
6. 54. Cancer Chemotherapy
7. 55. Immunopharmacology
8. 56. Introduction to Toxicology: Occupational & Environmental
9. 57. Heavy Metal Intoxication & Chelators
10. 58. Management of the Poisoned Patient
11. 59. Special Aspects of Perinatal & Pediatric Pharmacology
12. 60. Special Aspects of Geriatric Pharmacology

the 9th semester

1. 63. Therapeutic & Toxic Potential of Over-the-Counter Agents
2. 64. Dietary Supplements & Herbal Medications
3. 66 Important Drug Interactions & Their Mechanisms

Thematic plan of practical classes

the 4h semester

1. Development & Regulation of Drugs
2. Development & Regulation of Drugs
3. Histamine, Serotonin, & the Ergot Alkaloids
4. Histamine, Serotonin, & the Ergot Alkaloids
5. Vasoactive Peptides
6. Vasoactive Peptides
7. The Eicosanoids: Prostaglandins, Thromboxanes, Leukotrienes, & Related Compounds
8. The Eicosanoids: Prostaglandins, Thromboxanes, Leukotrienes, & Related Compounds
9. Nitric Oxide
10. Nitric Oxide
11. Test 1
12. Test 1
13. 23. The Alcohols
14. 23. The Alcohols
15. Drugs of Abuse
16. Drugs of Abuse

the 5th semester

1. Agents Used in Anemias; Hematopoietic Growth Factors
2. Agents Used in Anemias; Hematopoietic Growth Factors
3. Test 2
4. Hypothalamic & Pituitary Hormones
5. Adrenocorticosteroids & Adrenocortical Antagonists
6. The Gonadal Hormones & Inhibitors
7. Agents That Affect Bone Mineral Homeostasis
8. Test 3
9. Antiviral Agents
10. Antiviral Agents
11. Cancer Chemotherapy
12. Cancer Chemotherapy
13. Immunopharmacology
14. Introduction to Toxicology: Occupational & Environmental
15. Heavy Metal Intoxication & Chelators
16. Management of the Poisoned Patient
17. Test 4
18. Special Aspects of Perinatal & Pediatric Pharmacology

the 6th semester

1. 60. Special Aspects of Geriatric Pharmacology

2. 60. Special Aspects of Geriatric Pharmacology
3. 61. Dermatologic Pharmacology
4. 61. Dermatologic Pharmacology
5. 63. Therapeutic & Toxic Potential of Over-the-Counter Agents
6. 63. Therapeutic & Toxic Potential of Over-the-Counter Agents
7. 64. Dietary Supplements & Herbal Medications
8. 64. Dietary Supplements & Herbal Medications
9. 65. Rational Prescribing & Prescription Writing
10. 65. Rational Prescribing & Prescription Writing
11. 66. Important Drug Interactions & Their Mechanisms
12. 66. Important Drug Interactions & Their Mechanisms
13. Test 5

Text books and required supplies:
Basic & Clinical Pharmacology. Twelfth Edition. Edited by. Bertram G. Katzung ISBN 978-1259027598

Evaluation and grading:
Rating system for assessing student performance
The progress of students is assessed according to the rating system for assessing knowledge according to order of the Rector of the Kazan State Medical University.
The final rating of the discipline is calculated in points (70-100) using a special computer program and is the sum of four components, each of which is assigned a specific weight:

Rating components	Types of educational activity	Weight, %
1. Academic hours	Presence in the lectures and practical classes	10
2. Results of all modules and final test control	Average of all modules	35
3. Assessment of class marks	Average of all class marks	10
4. Exam	Result of exam	45
	Total	100

1. Academic hours. The volume of hours completed is calculated in % of the maximum number of classroom hours of the curriculum for the discipline. In the computer program for calculating the final rating, the number of classroom hours of lectures and practical classes missed by the student, as well as the number of hours of missed lectures and practical classes worked are entered.
If a student misses more than 50% of the classroom hours according to the curriculum (71 hours), the discipline is not certified, and the student must study the discipline again in full.
2. Results of all modules and final test control. The final results of all modules (control works) are entered into the computer program. The entire discipline "Pharmacology" is divided into 8 modules, which are distributed by semester as follows:
3 semester:

1. Principles of Drug Therapy
2. Drugs Affecting the Autonomic Nervous System
3. Drugs Affecting the Central Nervous System
4 semester:
4. Drugs Affecting the Cardiovascular System
5. Drugs Affecting the Endocrine System
5 semester:
6. Drugs for Other Disorders
7. Chemotherapeutic Drugs: antibiotics
8. Chemotherapeutic Drugs: other
At the end of each module, a control test is carried out with a score in points. The control test on the module is passed until a positive mark is obtained (70-100 points).
Upon completion of the study of the entire discipline, computer testing is carried out in all sections of pharmacology. The result of this test is also entered into the computer program for calculating the final rating.
3. Assessment of class marks. The arithmetic mean value of all current assessments in practical classes is calculated, which were set in accordance with the scale: "unsatisfactory" - 6 points; "satisfactory" - 7 points; "good" - 8 points; "very good" - 9 points; "excellent" -10 points.
In the computer program for calculating the final rating, the arithmetic mean value of the current grades in practical classes for the 5th and 6th semester is entered separately.
4. Result of the examination.
A positive mark on the exam is given in the range of 70-100 points. If a student does not attend the exam the score is not set and the rating is not calculated.
The exam is conducted in an oral form. 45 minutes is given for a completing notes
Students will need to orally answers to 5 topics, 20 points can be earned max for each topic. Each answer must include:
- Classification of the drugs with all available drug names and groups
- Mechanism of action if aaplicable
- Pharmacological effects
- Indications
- Common side effects
The maximum number of points is 100 points.
The final score of the exam and the results of the final rating for the discipline will be announced to all students the same day

Example of module No. 1.
Development & Regulation of Drugs. The pharmaceutical industry. Drug discovery. Preclinical safety & toxicity testing. Evaluation in humans. Confounding Factors in Clinical Trials. Drug Studies. The Types of Evidence. Clinical Trials: The IND & NDA. Conflicts of Interest. Translational Research. Adverse Drug Reactions. Orphan Drugs & Treatment of Rare Diseases

Example of module No. 2.
The Alcohols. Alcohol dehydrogenase pathway. Microsomal ethanol-oxidizing system (MEOS). Acetaldehyde metabolism. CNS, heart and smooth muscle effects of acute ethanol consumption. Consequences of chronic alcohol consumption: effects on liver and gastrointestinal tract, nervous

system, cardiovascular system, blood, endocrine system and electrolyte balance, immune system, fetal alcohol syndrome, increased risk of cancer. Alcohol-Drug Interactions. Management of acute alcohol intoxication and alcohol withdrawal syndrome. Treatment of alcoholism: naltrexone, acamprosate, disulfiram, ondansetron, baclofen, rimonabant. Other alcohols: methanol, ethylene glycol.

Example of module No. 3

Hypothalamic & Pituitary Hormones. Anterior pituitary hormones & their hypothalamic regulators: growth hormone (somatotropin), mecasermin, growth hormone antagonists. the gonadotropins (folliclestimulating hormone & luteinizing hormone) & human chorionic gonadotropin. Gonadotropin-releasing hormone & its analogs. Prolactin. Dopamine agonists. GRHR receptor antagonists. Posterior pituitary hormones: oxytocin, oxytocin antagonist, vasopressin (antidiuretic hormone, ADH), vasopressin antagonists. Treatment of obesity

Example of module No. 4

Antiviral Agents. Agents to treat herpes simplex virus HSV & varicella-zoster virus VZV infections. Agents to treat cytomegalovirus CMV. Antiretroviral agent: nucleoside & nucleotide reverse transcriptase inhibitors infections, nonnucleoside reverse transcriptase inhibitors, protease inhibitors, entry inhibitors, integrase strand transfer inhibitors. Antihepatitis agents. Anti-influenza agents. Other antiviral agents

Example of module No. 5

Special Aspects of Perinatal & Pediatric Pharmacology. Drug therapy in pregnancy. Drug therapy in infants & children. Pediatric dosage forms & compliance. Drug use during lactation. Pediatric drug dosage

«Example of exam ticket»

Clinical Pharmacology exam paper

Please prepare an oral answer for the following questions.

Student

name:_____

Development & Regulation of Drugs. The pharmaceutical industry. Drug discovery. Preclinical safety & toxicity testing. Evaluation in humans. Confounding Factors in Clinical Trials. Drug Studies. The Types of Evidence. Clinical Trials: The IND & NDA. Conflicts of Interest. Translational Research. Adverse Drug Reactions. Orphan Drugs & Treatment of Rare Diseases

The Gonadal Hormones & Inhibitors. The ovary: estrogens, progestins, hormonal contraception (oral, arenteral, & implanted contraceptives), estrogen & progesterone inhibitors & antagonists. ovulation-inducing agents. The testis: androgens & anabolic steroids, antiandrogens, & male contraception

Heavy Metal Intoxication & Chelators. Toxicology of heavy metals. Lead. Arsenic. Mercury. Pharmacology of chelators. Dimercaprol (2,3-dimercaptopropanol, BAL). Succimer (dimercaptosuccinic acid, DMSA). Edetate calcium disodium ethylenediaminetetraacetic acid, EDTA). Unithiol (dimercaptopropanesulfonic acid, DMPS). Penicillamine (d-dimethlcysteine). Deferoxamine. Deferasirox. Prussian blue (ferric hexacyanoferrate).

«Evaluation of exam answer»

Total marks for the oral answer_____ (100 out of 100)
The final result for the exam _____(out of 100)

FIRST AID

Teachers: Prof. Ainagul Bayalieva, assistant lecturer Timur Turaev, assistant lecturer Alexander Antonov
Building, Department, classroom # NUK, Anesthesiology and Reanimatology, Disaster Medicine Department, Chair of Department, 5 floor, room 515,516,517,519,521,526
Contact details:
Telephone number: 8(843) 236 05 33 (Prof. Ainagul Bayalieva)
E-mail address: airmk@mail.ru
Office and working hours: 517 (9-17)

Total hours — 72:
- Lectures 10 hours;
- Practical classes 30 hours;
- Independent work 32 hours;

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (http://www.kgmu.kcn.ru:40404/moodle/login/ index.php).__

Course objectives: The purpose of mastering the discipline
mastering the academic discipline (module) of First aid:
• mastering knowledge of the main issues of pathogenesis and clinical manifestations of pathological conditions developing as a result of accidents and acute therapeutic, surgical, gynecological, nervous diseases in adults and children that threaten the life of the patient (victim) and require first aid, as well as the principles of first aid in these conditions, the algorithm of actions in providing pre-medical care in case of disasters and emergency situations.
• formation and development of competencies among graduates of the specialty "pharmacy" aimed at restoring and improving the health of patients by providing appropriate quality medical care.
• early immersion in the specialty with the formation of the foundations of general cultural and professional skills and competencies under the guidance of a teacher in conditions close to real.

Tasks of the discipline:

To form knowledge in the field of:

The tasks of mastering the discipline:

• to form the fundamental knowledge and skills of providing any emergency medical first aid;
• teach students the principles of diagnosing life-threatening emergencies,
• teach students to perform intensive care activities competently;
• teach students to use standard remedies to temporarily stop bleeding;
• teach students how to inject medicines;
• teach students to apply standard transport tires;
• teach students how to apply bandages to wounds;
• to form fundamental knowledge in the field of clinical toxicology (poisoning) and teach how to use antidotes;
• to inform about the organization and structure of the emergency medical service and to form students' knowledge about the role, place and algorithm of the pharmacist's actions in this structure of emergency care in case of disasters and emergencies;
• teach students the basics of asepsis and antiseptics;
• to teach students the rules of transportation of the sick and injured;
• to teach students the rules of patient care;
• to develop students' stable practical skills in providing pre-medical care for the most common emergency conditions
• to develop students' skills in studying scientific literature and official statistical reviews;
• to develop students' communication skills with the patient, taking into account ethics and deontology, depending on the identified pathology and characterological characteristics of patients;
• to form the student's communication skills with the team.

Course topics:

Calendar plan of lectures

1. First aid: tasks, scope and basic principles of first aid. Organizational foundations of emergency and emergency care. The history of the emergency medical service. Ethics and deontology in working with a patient. "Terminal condition" Clinical symptoms. Stages of terminal condition. Cardiopulmonary resuscitation.
2. Acute respiratory failure. Asphyxia. Laryngeal stenosis (Quincke's edema, foreign body of the upper respiratory tract and bronchi, false croup, laryngeal diphtheria - true croup). Suffocation. Asthmatic status. An attack of cardiac asthma. An attack of bronchial asthma. Clinic. Diffdiagnostics. The algorithm of first aid.
3. Shock. The main pathogenetic mechanisms. The clinical picture of traumatic, hypovolemic, cardiogenic and septic shock. Examination of the patient and criteria for assessing the severity of the condition. The basics of differential diagnosis. Phases of shock. First aid.
4. Coma. Types of com. Features of the examination of the patient. Criteria for assessing the patient's state of consciousness. The main pathogenetic mechanisms. Features of clinical symptoms of diabetic (ketoacidotic, hyperosmolar, hyperlactacidemic, hypoglycemic)

coma, infectious coma, hepatic coma, hypochloremic coma. Diffdiagnostics. The algorithm of first aid..

5. Epileptic status and other convulsive conditions. delirium. Excitement. Hallucinations. The clinical picture. Differential diagnostic criteria. The algorithm of first aid..
6. Emergency conditions in pediatrics. Neurotoxicosis. Intestinal toxicosis. Acute respiratory failure in children. Acute poisoning. Features of providing first aid to children.
7. Emergency care in obstetric and gynecological practice. Pregnancy (trimesters, criteria for assessing the condition of a pregnant woman). Childbirth. Childbirth outside the hospital. Clinical symptoms. Features of the flow. Providing first aid to a woman in labor and a newborn. Bleeding. "Acute abdomen" in gynecological practice. Pre-medical diagnostics. The algorithm of first aid.

Calendar plan of laboratory classes

1. First aid: tasks, scope and basic principles of first aid. Organizational foundations of emergency and emergency care. The history of the emergency medical service. Ethics and deontology in working with a patient.
2. Acute respiratory failure. The algorithm of first aid.
3. First aid in case of shock. The main pathogenetic mechanisms.
4. The algorithm of first aid in case of coma.
5. Rules of first aid for various types of poisoning.
6. The algorithm of first aid for epileptic status and other convulsive conditions.
7. First aid for traumatic, internal and other types of bleeding.Module on topics 1-7
8. Emergency conditions in pediatrics. Features of providing first aid to children.
9. Emergency care in obstetric and gynecological practice. Providing first aid to a woman in labor and a newborn.
10. Desmurgy, transport immobilization, transportation of victims
11. First aid for injuries, burns, frostbite and freezing.
12. Module on topics 8-12
13. Outcoming testing. Final test

Text books and required supplies:

a) basic literature:

1. First aid [Text] : textbook. the manual; edited by V. M. Velichenko, G. S. Yumashev; [V. M. Velichenko, G. S. Yumashev, H. A. Musalatov, etc.] . - M. : Medicine , 1989. - 272 p. : ill. - (Educational literature. For students of pharmaceutical institutes) . - 0-80

2. Rogova N. V. First aid [Text] : textbook. a student's manual. III course of pharm. full-time and part-time forms of education / Rogova N. V. ; edited by V. I. Petrov; Ministry of Health of the Russian Federation, VMA, Kaf-ra clinic. pharmacology . - Volgograd : Publishing House of the Volga , 2002 . - 182 p. - Bibliogr.: pp.182 . - 27-96

b) additional literature:

1. Disaster medicine [Text] : textbook. the manual ; edited by V. M. Ryabochkin, G. I. Nazarenko; [author : Yu. V. Aksenov, A. A. Alexandrovsky, T. I. Borovskikh, etc.] . - M. : INI Ltd , 1996. - 262 p. : ill. - (Educational literature. for students of secondary medical schools) . - 26-00 ; 35-50 ; 60-00

2. Emergency care at the prehospital stage/ Zhavoronkov V.F., Antonov A.M..Kazan. :KSMU, 2002-38c.
3. Guidelines for Primary Health Care, 2006 [Text] : with adj. on the CD : for doctors providing primary medical care. Help : [study. a manual for the system of occupational health and safety of doctors] ; chief editors : A. A. Baranov, I. N. Denisov, A. G. Chuchalin ; Assoc. med. ob-v on quality. Moscow : GEOTAR-Media , 2006 . - 1521 p. + 1 CD-ROM. - (National project "Health") . - Prem. Decree : pp. 1535-1521 . - 860-00
4. Nagnibeda A. N. Paramedic of the ambulance [Electronic resource] : practice. guide / Nagnibeda A. N. - St. Petersburg : SpetsLit , 2009 . - Access mode: http://www.studmedlib.ru
5. Levchuk I. P. Medicine of catastrophes [Electronic resource]: a course of lectures / Levchuk I. P., Tretyakov N. V. - M. : GEOTAR-Media , 2011 . - 220 p. - Access mode: : http://studmedlib.ru
6. Kornilov N. V. Traumatology and orthopedics [Electronic resource] : textbook. student's handbook. universities on spec. 020100 Medical business, 020200 Pediatrics / Kornilov N. V., Gryaznukhin E. G., Shapiro K. I., etc. ; edited by N. V. Kornilov. - 2nd ed. St. Petersburg : Hippocrates , 2005. - 538 p. : ill. - (Educational literature for students of medical universities) . - Auth. col. it is indicated on the back of tit. l . - Bibliogr.: pp.533 . - 262-50 - Access mode: : http://studmedlib.ru

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – “poor”, 70-79 – “satisfactory”, 80-89 – “good”, 90-100 – “excellent”.

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

ATTENDANCE REQUIREMENTS

Attendance will be recorded in lecture and seminar journals.

In case of illness or other reasons for which you will not be able to attend classes, you must notify the dean's office and department, provide a medical certificate or permission from the dean's office to miss classes for a good reason. Working off the missed lectures can be carried out on the educational portal. Your tutors will give you specific deadlines for reopening resources. Working off missed seminars will require the fulfillment of all types of practical tasks provided for by the discipline program in these classes.

Students who missed more than 50% of classes will have to retake the discipline.

Students who believe that the assessment of his work was affected by extraordinary circumstances can write a reasoned explanation to the head of the department or to the dean's office.

CURRENT CONTROL

Requirements for current control

Written test:

example questions:

1. The pathogenesis of true drowning in salt water.
2. Definition and first aid in case of fainting.
3. Types of allergens.

4. What diseases lead to a sharp increase in myocardial oxygen demand?
5. Trial ulcers of the stomach, intestines (clinic, definition, first aid).

6. What diseases are most often accompanied by fever?
7. Poisoning with lead and its compounds (clinic, first aid).

Oral interview on the following issues:

Sample questions:

1. Bleeding. Definition. Classification of bleeding.
2. Signs of arterial, capillary, venous, mixed bleeding.
3. General signs of internal bleeding, determination of the volume of blood loss.
4. Ways to temporarily stop external bleeding. Anterior nasal tamponade.
5. Rules for applying a hemostatic tourniquet.
6. Principles of providing assistance to those who have suffered significant blood loss.
7. Classification of blood substitutes.

8. Methods for determining blood type and Rh factor.
9. Rules for the preparation of a system for blood transfusion and blood substitutes.
10. Criteria for the goodness of canned blood.
11. Technique of performing blood transfusion tests.
12. Rules of blood transfusion and blood substitutes and prevention of transfusion complications.

INTERIM CERTIFICATION
The discipline "FIRST AID" ends with an intermediate certification in the form of a test.
The account includes:
The presence of passed tests on all topics and the final test.
The student must have 100% attendance of both lectures and practical classes or work them out by the end of the course of the discipline.
During the passage of the discipline, the student in the journal of practical exercises should have at least 3 marks:
The answer is evaluated during the survey,
Protection of the abstract message,
Answer during the analysis of a situational problem.
Providing an intermediate grade for completing the course.

PHARMACEUTICAL INFORMING

Teachers: assistant Novikov Ya.S.
Building, Department, classroom: Institute of the Pharmacy, Training Pharmacy (1st floor)
Contact details:
Telephone number: +7(909)606-08-23 (assistant Novikov Ya.S.)
E-mail address: yaroslav.novikov@kazangmu.ru
Office and working hours: Department of management and economics of pharmacy, 313, 9-17
Total hours — 180:
- Lectures 26 hours
- Practical classes 75 hours
- Independent work 79 hours

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.

Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=3151).

The purpose of this discipline is to equip students with theoretical knowledge and practical skills in the field of pharmaceutical counselling and informing dissemination.

Tasks of the discipline:
Develop students' skills in pharmaceutical counselling for patients and healthcare professionals to facilitate individualized, monitored, safe, and effective pharmacotherapy.
Foster the abilities required to address specific scientific research and applied tasks in the field of clinical pharmacology while adhering to the fundamental principles of informing security.
Formation of students' skills in communication with teams, partners, patients, and their relatives visiting the pharmacy, considering ethics and deontology.
Acquisition by students of knowledge and skills for quick use of official electronic and other informing resources to obtain prompt and up-to-date informing about medicinal products.
Teaching students about the types of services provided in a pharmacy organization.
Educating students on the legal foundations of counselling and informing consumers of pharmaceutical services.
Teaching students the fundamentals of professional and business communication.

Course topics:
Calendar plan of lectures
1. Pharmaceutical counselling and informing laws and regulation
2. Pharmaceutical counselling and informing on products for children, pregnant and lactating women
3. Pharmaceutical counselling and informing on care products
4. Pharmaceutical counselling and informing on products for the treatment of cardiovascular diseases
5. Pharmaceutical counselling and informing on products for the treatment of gastrointestinal diseases
6. Pharmaceutical counselling and informing on products for the treatment of respiratory diseases
7. Pharmaceutical counselling and informing on products for the treatment of UTIs
8. Pharmaceutical counselling and informing on products for the treatment of skin diseases
9. Pharmaceutical counselling and informing on products for the treatment of pain
10. Pharmaceutical counselling and informing on products for the treatment of eye diseases
11. Pharmaceutical counselling and informing on products for the treatment of allergy
12. Pharmaceutical counselling and informing on products for the treatment of colds and influenza
13. Pharmaceutical counselling and informing on physiotherapy products

Calendar plan of laboratory classes
1. Pharmaceutical counselling and informing on products for children, pregnant and lactating women
2. Pharmaceutical counselling and informing on care products

3. Pharmaceutical counselling and informing on products for the treatment of cardiovascular diseases
4. Pharmaceutical counselling and informing on products for the treatment of gastrointestinal diseases
5. Pharmaceutical counselling and informing on products for the treatment of respiratory diseases
6. Pharmaceutical counselling and informing on products for the treatment of UTIs
7. Pharmaceutical counselling and informing on products for the treatment of skin diseases. Module No. 1.
8. Pharmaceutical counselling and informing on products for the treatment of pain
9. Pharmaceutical counselling and informing on products for the treatment of eye diseases
10. Pharmaceutical counselling and informing on products for the treatment of allergy
11. Pharmaceutical counselling and informing on products for the treatment of chronic venous insufficiency
12. Pharmaceutical counselling and informing on products for the treatment of colds and influenza
13. Pharmaceutical counselling and informing on devices for measuring health indicators at home
14. Pharmaceutical counselling and informing on physiotherapy products
15. Pharmaceutical counselling and informing on orthopedic products. Module No. 2.

Text books and required supplies:

1. Rutter P. Community Pharmacy: Symptoms, Diagnosis and Treatment. 5th ed. Elsevier, 2020. 416 p.
2. Communication Skills in Pharmacy Practice: A Practical Guide for Students and Practitioners (5th Edition) By William N Tindall, Robert S Beardsley and Carole L Kimberlin 2011, 242 p., Lippincott Williams & Wilkins
3. Oxford Handbook of Clinical Pharmacy / edited by Philip Wiffen, Marc Mitchell, Melanie Snelling, Nicola Stoner. – New York : Oxford University Press Inc., 2012. – 695 p
4. Pathology and Therapeutics for Pharmacists. A basis for clinical pharmacy practice / Russell J Greene, Norman D Harris // Pharmaceutical Press. – 2008. – 1009 p.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is

given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.
Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".
Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Example of module No. 1.
Pharmaceutical counselling algorithm
Childhood Conditions. Infantile colic. Teething. Description, causes and symptoms of the disease. Management.
Ambulatory assistive devices (AAD): canes, crutches, and walkers. Device description/important features. How to operate/use. Storage conditions and maintenance. Special tips for patient counseling.
Importance of Patient-Centered Communication in Pharmacy Practice.

Example of module No. 2
Sinus headache. Tension headache. Symptoms, diagnosis, management. Patient counseling information at the pharmacy.
Contact lenses. Cleaning solutions. Rinsing and disinfection solutions. Comfort solutions. Protein removal. Complications related to contact lens wear.
Allergic rhinitis. Causes, symptoms, management.
Pharmacy skills. Communicating with children about medicines.

EVALUATION OF THE MODULE ANSWER
The question card of the module consists of 4 questions
Questions 1 - 3 on pharmaceutical counselling and informing on certain disease are evaluated by 25 points (with the step of 5 points)
Total: 3 x 25 = 75 points
Questions 4 on communication skills in the pharmacy is evaluated by 25 points (with the step of 5 points)
Total: 1 x 25 = 25 points
Total for all question: 75 + 25 points = 100 points

PHARMACEUTICAL LOGISTICS

Teachers: Prof. Tukhbatullina R.G.
Building , auditorium of the Institute of Pharmacy 4-14
Contakt details:
• Telephone number: +79172664566
• E-mail address: rgtuhb@mail.ru
• Office and working hours : 4-14

Total hours — 108:
- Lectures 16 hours;
- Practical classes 45 hours;
- Independent work 47 hours.

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (http://www.kgmu.kcn.ru:40404/moodle/login/ index.php).

Course objectives: The purpose of mastering the discipline.
Formation of theoretical knowledge and practical skills in students in the field of pharmaceutical logistics.

Tasks of mastering the discipline:
1.study of the basics of pharmaceutical logistics, basic concepts, tasks, functional subsystems, the formation of channels of goods movement in the Russian pharmaceutical market;
2.study of the principles of procurement logistics in the activities of a pharmaceutical organization, the procedure for selecting a supplier and documenting the relationship between supplier and buyer;
3. introduction to the production logistics of a pharmaceutical organization, pre-sale preparation of pharmaceutical goods, warehousing logistics;
4. study of sales logistics, parameters of competitiveness of pharmaceutical organizations;
5. study of transport logistics in the activities of pharmaceutical organizations;
6. formation of competences on system knowledge, skills and abilities of pharmaceutical logistics.

Course topics:
Calendar plan of lectures
1. Object, subject, essence and main categories of logistics.

2. Functional areas of logistics. Concepts of logistics.
3. Logistics chain management in modern economy.
4. Purchasing logistics of a pharmaceutical organization.
5.Management of commodity stocks. Production logistics and pre-sale preparation of goods.
6.Warehousing logistics of a pharmaceutical organization.
7. Sales logistics of pharmaceutical organization.
8.Transport logistics in the organization of goods movement of medicines and other goods of pharmacy assortment.

Calendar plan of practical (seminar) classes
1. Concepts and definitions of the essence of the main categories of logistics. Modern concepts of the object and subject of logistics.
2. Improvement of pharmaceutical organizations with the help of concepts of rational management logistics.
3.The main tasks of chain management.
4.Definition of procurement logistics. Types of suppliers of pharmaceutical goods.
5.Characteristics of commodity stocks, their classification. Implementation of goods acceptance in pharmaceutical organization.
6.Procedure and rules of storage of pharmaceutical goods. Requirements for storage facilities for pharmacy goods.
7.Organisation of sales activities of the pharmaceutical organization. The system of customer relationship management.
8.Organisation of transportation and forwarding of orders in the pharmaceutical market. Requirements for the transport of medicines and other groups of goods of pharmacy assortment.

Forms current control forms of current control of progress: To evaluate learning outcomes in the form of knowledge, types of control are used.
1.Tasks for decision-making in a problem situation;
2. Tasks for decision-making in a choice situation;
3. Interview;
4. Testing.
Text books and required supplies:
1. Pharmaceutical logistics: teaching aid for students studying on speciality 33.05.01 ‘Pharmacy’/Kazan State Medical University of the Ministry of Health of the Russian Federation; compiler Tukhbatullina R.G. -Kazan: KSMU, 2023-21 pp.
2. Fundamentals of pharmaceutical logistics: textbook / G. N. Andrianova, A.A.Karimova, I.P.Davydov, A.L.Petrov ; FGBOU VPO UMMU Ministry of Health of Russia.-Ekaterinburg: Publishing house UMMU, 2016.-160s.ISBN 978-5-89895-784-1

Evaluation and grading:
Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it . Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

The credit is conducted in the form of a final test. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".
Overall student rating is build up from class attendance, module and test results, midterm assessment results.
The final test is conducted on the educational portal of the medical university.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

PHARMACEUTICAL MARKETING

Teachers: Abdullina Julia
Building, Department, classroom # Institute of pharmacy, Department of Economic and management of pharmacy, 305
Contact details:
Telephone number: 89656310500 (Ph.D. of Pharmaceutical Sciences Julia Abdullina)
E-mail address: abdullina.prof@yandex.ru
Office and working hours: - 305, Institute of Pharmacy, Saturday
Class hours: 108 h
Lectures 16 hours;
Practical lessons 45 hours;
Independent work 47 hours.

Course description:

Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.

Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.

Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.

Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.

Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=3217).

Course objectives: The purpose of mastering the discipline

Purpose mastering the discipline: Formation in students of systemic knowledge, skills and abilities in various areas and aspects of the pharmaceutical market, orientation in information flows of professional marketing information, research; mastering marketing analysis of the range of medicines of a pharmacy organization, the ability to independently develop a marketing plan for the organization.

Tasks of the discipline:

1. Master theoretical knowledge of marketing and its concepts that are used in pharmacy;
2. To gain applied knowledge in the field of developing forms and methods of marketing management of a pharmacy organization, in particular, the formation of product and sales policy, as well as distribution and promotion policy;
3. Master the skills of practical implementation of theoretical and applied knowledge in the activities of a pharmacist (pharmacist-manager) in a pharmacy organization The student must master the following competencies, including:

GPC-3. Able to carry out professional activities taking into account specific economic, environmental, social factors within the system.

GPC-3 ID-1. Complies with the norms and rules established by authorized government bodies when solving problems of professional activity in the field of circulation of medicines.

Course topics:

Calendar plan of lectures

1. Theoretical foundations of pharmaceutical marketing
2. Methodological foundations of marketing research
3. Studying the demand for pharmaceutical products
4. General principles for determining the need for medicines means
5. Pharmaceutical market segmentation
6. Assortment policy of a pharmaceutical organization. Analysis product life cycle
7. Principles of product promotion in the pharmaceutical market
8. Merchandising in pharmacy

Calendar plan of laboratory classes

Section 1. Introduction to Pharmaceutical Marketing

Topic 1.1.Theoretical foundations of pharmaceutical marketing

Contents of the practical lesson topic: Theoretical foundations of pharmaceutical marketing

Contents of the topic of independent work: Theoretical foundations of pharmaceutical marketing

Topic 1.2. Methodological foundations of marketing research

Contents of the practical lesson topic: Methodological foundations of marketing research

Contents of the topic of independent work: Methodological foundations of marketing research

Topic 1.3.Studying the demand for pharmaceutical products

Contents of the practical lesson topic: Studying the demand for pharmaceutical products

Contents of the topic of independent work: Studying the demand for pharmaceutical products

Topic 1.4.General principles for determining the need for medicines means

Contents of the practical lesson topic: General principles for determining the need for medications means. Determining the need for medicines specific action and limited consumption. Definition needs for broad-spectrum drugs

Contents of the topic of independent work: General principles for determining the need for medications means. Determining the need for medicines specific action and limited consumption. Definition needs for broad-spectrum drugs

Section 2. The concept of product in pharmaceutical marketing

Topic 2.1.Pharmaceutical market segmentation

Contents of the practical lesson topic: Pharmaceutical market segmentation

Contents of the topic of independent work: Pharmaceutical market segmentation

Topic 2.2. Assortment policy of a pharmaceutical organization. Product life cycle analysis

Contents of the practical lesson topic: Development of assortment policy for a pharmaceutical organization. Product life cycle analysis

Contents of the topic of independent work: Assortment policy of a pharmaceutical organization. Product life cycle analysis.

Topic 2.3.Principles of product promotion in the pharmaceutical market

Contents of the practical lesson topic: Principles of product promotion in the pharmaceutical market

Contents of the topic of independent work: Principles of product promotion in the pharmaceutical market

Topic 2.4.Merchandising in pharmacy

Contents of the practical lesson topic: Merchandising in pharmacy

Contents of the topic of independent work: Merchandising in pharmacy

Text books and required supplies:

1. Management and marketing in pharmacy Textbook for Foreign Students of Higher Pharmaceutical Schools Authors: Mnushko Zoia M., Sofronova Iryna V., Aliekperova Nataliia V., Pestun Iryna V., Timanyuk Iryna V // file:///C:/Users/abdul/Downloads/mmph_Part_I.pdf
2. Principles of marketing F.Kotler file:///C:/Users/abdul/Downloads/Principles_of_Marketing_US_Edition_17e.pdf
3. Pharmaceutical marketing. Practice guide https://pdfprof.com/PDF_DocsV2/Documents/367052/2/2

Evaluation and grading:

For evaluate learning outcomes in the form of knowledge, the following types of control are used: – test; Examples of test tasks:

1. An offer in marketing means: a) range of goods; b) consumption of goods; c) perceived need for goods; d) form of manifestation of the need; e) commercial exchange.

2. Which of the following consumers of pharmaceutical services are considered final: a) individuals and their families; b) medical institutions; c) medical workers; d) wholesale and retail trade in medicines and other pharmaceutical products; e) pharmacies.

3. Remarketing is aimed at: a) revival of demand; b) maintaining the balance of demand; c) change in negative demand; d) maintaining emerging demand; e) maintaining fluctuating demand. To criteria for assessing test control: An “excellent” grade is given to a student if he gave the correct answer to 100– 90% of test tasks. A “good” grade is given to a student if he gives the correct answer to 89–80% of test items. A “satisfactory” grade is given to a student if he gave the correct answer to 79– 70% of test items. An “unsatisfactory” grade is given to a student if he gave the correct answer to 69% and < test items.

interview; Examples of tasks: 1. Pharmaceutical environment. Types of drug users 11 2. Pharmaceutical market. Marketing categories. Objectives and role in providing the population with medicines. 3. Demand. Need. Standards for drug stocks in medical and pharmacy organizations. To interview assessment criteria: "Excellent” (90-100 points) – an oral report answers the question posed in full, the correct interpretation of the terms is given, and key issues are considered. "Good” (80-89 points) – the oral report answers the question posed in full, the correct interpretation of the terms is given, the key issues of the topic are partially considered. "Satisfactory” (70-79 points) – the oral report answers the question posed, but not fully, the correct interpretation of the terms is given, the key issues of the topic are partially considered. "Unsatisfactory” (0-69 points) – the oral communication does not answer the question posed, terms are misinterpreted, key issues of the topic are not addressed

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

CHROMATOGRAPHIC METHODS IN CHEMICAL AND TOXICOLOGICAL ANALYSIS

Teachers: Elizaveta Baltaeva, Dr. Alexandra Sitenkova
Building, Department, classroom: Institute of Pharmacy, Department of Pharmaceutical chemistry, 419, 421, 433.
Contact details:
Telephone number: +7 (843) 521-16-42 (Guzel Ganieva)
E-mail address: institute.pharmacy@kazangmu.ru
Office and working hours: 201 (9-17, lunch time 12-13)

Class hours:
Lectures: 10 hours
Practical lessons: 30 hours
Self-study: 32 hours
Total: 72 hours

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University.

Course objectives:
The purpose of mastering the discipline: to teach students the theoretical and practical foundations of chromatographic methods for studying toxicants in chemical-toxicological analysis in preparation for professional activities in the specialties: "Pharmacy", "Forensic Medical Examination" and "Clinical Laboratory Diagnostics".
The objective of the discipline is that, based on the theoretical knowledge acquired and practical mastery of chromatographic methods of analysis, as well as methods for calculating experimental results, students could correctly select methods for studying substances in accordance with the problem posed to them, develop an analysis scheme, practically conduct it and interpret the results obtained.
As a result of mastering the discipline, the student must demonstrate the following educational outcomes:

- master the basics of chromatography theory;
- master the skills of chemical experimentation and carry out systemic chemical-toxicological analysis in accordance with legislative and regulatory documents;
- master the skills of working with modern educational and scientific equipment when conducting chemical experiments;
- master the methods of recording and processing the results of chemical-toxicological analysis;

Course topics:

Calendar plan of lectures

1) Basic concepts and definitions.
2) Theoretical foundations of chromatography.
3) Gas chromatography.
4) Liquid chromatography.
5) Thin layer and paper chromatography.

Calendar plan of laboratory classes

1. Topic 1.1. Basic concepts and definitions. The essence of the chromatographic method. The history of its origin. The current state of the method and its field of application, its significance and place among other analytical methods. Types of chromatographic processes. Classification of chromatographic methods according to the state of aggregation of phases, the mechanism of interaction of the sorbate-sorbent, the technique used, the method of relative movement of the phases.
2. Topic 1.2. Theoretical foundations of chromatography. Basic characteristics of the chromatographic process. Distribution coefficient. Retention volume and retention time. Capacitance factor. Retention coefficient, its physical meaning. Selectivity and efficiency of chromatographic separation. Separation criterion. Permission. Equilibrium chromatography theory. Resolution between the rate of movement of a substance along a bed of a stationary phase with the distribution coefficient and sorption isotherm. Dependence of the shape of the chromatographic peak on the type of sorption isotherm. Blurring of the chromatographic zone and its physical causes. Non-equilibrium chromatography. Basics of the concept of theoretical plates, connection with countercurrent distribution. The number of theoretical plates and the efficiency of the column. The concept of height equivalent to a theoretical plate. Disadvantages of the theoretical plate concept. Kinetic theories of chromatography. Factors affecting the erosion of zones (vortex diffusion, molecular diffusion, resistance to mass transfer in the mobile and stationary phases). Dependence of height equivalent to a theoretical plate on the flow rate. Van Deemter equation. Schematic diagram of a chromatograph. Choice of parameters for chromatographic determination. Identification of substances. Quantitative analysis. Measurement of areas and heights of peaks. Internal and external standards methods. Sources of mistakes, reproducibility of measurements.
3. Topic 2.1. Gas chromatography. The principle of the method. Theoretical foundations of the method. Determined substances. Basic analytical characteristics. Gas-adsorption and gas-liquid chromatography. Gas chromatography equipment. Chromatographic columns, thermostats, detectors. Classification of detectors and their most important characteristics (linearity, sensitivity, signal-to-noise ratio, detection limit). Temperature programming.

Carrier gases, adsorbents and stationary phases, requirements for them. Examples of applying.

4. Topic 2.2. Qualitative gas chromatographic analysis. Identification of substances based on retention values. Testers method. Kovacs retention indices. Sources of errors in their determination. Quantitative gas chromatography technique.
5. Topic 2.3. GLC method in the analysis of ethyl alcohol in biological objects, food and technical liquids, in alcohol surrogates. Determination of the degree of alcoholic intoxication.
6. Topic 3.1. Liquid chromatography. The principle of the method. Determined substances. Analytical characteristics of modern high performance chromatography (HPLC). Equipment for liquid chromatography. Liquid chromatographs (column, capillary). Pumps. Sample inlets. Columns. Detectors and their choice. Sample preparation.
7. Topic 3.2. Adsorption chromatography. Basic concepts of the mechanism of liquid adsorption chromatography (LAC): the role of the surface chemistry of the adsorbent and the nature of the liquid mobile phase. Silica gel, its structure and surface chemistry. Modified silica gels, principles of their preparation and properties. Aluminum oxide and other sorbents in LAC. Requirements for them. Mobile phase (eluent) and requirements for it. Elution force of the mobile phase, eluotropic series. Influence of the nature and composition of the eluent on the selectivity of separation in LAC. Isocratic and gradient elution. Effect of temperature on elution. Normal phase LAC on silica gel. Retention models and types of interaction of the sorbate with the sorbent surface. The role of water. Scopes of normal-phase LAC using. Reverse phase chromatography on modified sorbents. Retention mechanisms. Solvophobic retention theory. Influence of sorbate structure on retention (dipole moment, polarizability, molecular volumes, hydrophobic surface area). Influence of the ratio of polar and non-polar groups, intramolecular bonds and distribution of electron density in sorbate molecules on their retention. Reverse phase HPLC application.
8. Topic 4.1. Thin layer and paper chromatography. Theoretical foundations of the methods. Rf value, its relationship with the distribution coefficient. Methods for determining this value. Factors influencing it. Chromatography papers, supports, thin layer chromatography (TLC) sorbents. Solvents for paper and thin layer chromatography. Techniques for obtaining chromatograms: ascending, descending, one-dimensional, two-dimensional and circular. Electrophoretic paper chromatography. Methods of qualitative and quantitative analysis. Highly efficient TLC. Areas of use.
9. Topic 4.2. TLC screening in CTA analysis of substances of basic and acidic character.
10. Topic 4.3. Intra-group TLC screening in private solvent systems.
11. Final test control.

Text books and required supplies:

1. State Pharmacopoeia of the Russian Federation XV edition (https://pharmacopoeia.regmed.ru/pharmacopoeia/izdanie-15/).
2. Medine is a medical abstract and bibliographic database/search system. The PubMed system provides access to Medine. PubMed documents medical and biological articles from specialized literature, and also provides links to full-text articles if they are available on the Internet. Pubmed contains abstracts from the following areas: medicine,

dentistry, general health care, psychology, biology, genetics, biochemistry, cytology, biotechnology.

3. Legal reference system "Consultant Plus" (cooperation agreement dated 07.06.2002). Access from library computers.
4. Scientific Electronic Library eLIBRARY.RU (http://elibrary.ru/)
5. English-Russian Dictionary of Pharmaceutical Terms [Electronic resource]: for training in the specialty 33.05.01 "Pharmacy" / Kazan State Medical University of the Ministry of Health of the Russian Federation, Department of Foreign Languages; [compiled by O. Yu. Makarova et al.]. - Electronic text data (759 KB). - Kazan: KSMU, 2018. - 173 p.
6. Fundamentals of Chromatography [Electronic resource]: a teaching aid for students of the Faculty of Pharmacy / Kazan State Medical University of the Ministry of Health of the Russian Federation, Department of Pharmaceutical Chemistry with courses in analytical and toxicological chemistry; [compiled by: S. A. Sidullina, N. M. Nasybullina]. - Electronic text data. (914 Kb). - Kazan: KSMU, 2013. - Part 1: Gas-liquid chromatography and high-performance liquid chromatography. - 2013. - 74 p.
7. Fundamentals of chromatography [Electronic resource]: textbook. and method. manual for students of the pharmaceutical faculty / Kazan. State Medical University of the Ministry of Health of the Russian Federation, Dept. of Pharmaceutical Chemistry with courses in analytical and toxicological chemistry; [compiled by: S. A. Sidullina, N. M. Nasybullina]. - Electronic text data. (374 Kb). - Kazan: KSMU, 2013. - Part 2: Ion-exchange and thin-layer chromatography. - 2013. - 50 p.
8. Laboratory work [Electronic resource]: textbook. and method. manual on toxicological. Chemistry for fourth-year full-time students / Kazan State Medical University of the Federal Agency for Health and Social Development, Department of Pharmaceutical Chemistry with courses in analytical and toxicological chemistry; [compiled by: L. A. Zhigalko, R. I. Mustafin]. - Electronic text data. (473 Kb). - Kazan: KSMU, 2011. - 50 p.
9. Laboratory Work [Electronic resource]: teaching aid on toxicological chemistry for fourth-year full-time students / Kazan State Medical University of the Federal Agency for Health and Social Development, Department of Pharmaceutical Chemistry with courses in analytical and toxicological chemistry; [compiled by: L. A. Zhigalko, R. I. Mustafin]. - Electronic text data. (473 Kb). - Kazan: KSMU, 2011. - 50 p.
10. Study guide on the subject "Toxicological Chemistry" for 4th-year students of the Institute of Pharmacy [Electronic resource] / I.K. Tukhbatullina; Kazan. State Medical University of the Ministry of Health of the Russian Federation. - Kazan: MedDoK, 2018. - 153 p.
11. Modern methods of pharmaceutical analysis [Electronic resource]: textbook for training in the specialty "Pharmacy" / Kazan. State Medical University of the Ministry of Health of the Russian Federation; [compiled by I.K. Tukhbatullina et al.]. - Electronic text data. (468 KB). - Kazan: KSMU, 2019. - 83 p.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquium/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral, questions with full answer or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

1. Be respectful
2. Be careful with equipment
3. Be disciplined
4. Be prepared for the classes
5. Be involved, do not hesitate to ask questions
6. Look professional: you have to wear clean white coat and change shoes
7. Eating is allowed only during brakes
8. Using phone is allowed only during brakes

Examples of Final testing questions:
1. Chromatography refers to the methods:
1. Spectral;
2. Separation;
3. Chemical;
4. Electrochemical
5. Pharmacological.

2. Chemical-toxicological analysis for "volatile" poisons by GLC should be carried out on:
1. One column of medium polarity;
2. One highly polar column;
3. One column of low polarity;
4. Two columns of different polarity;
5. Two columns of the same polarity.

3. In which unit of the gas chromatograph is the chromatographic separation of the components of the mixture carried out:
1. In the detector;
2. In the gas chromatographic column;
3. In the dosing device;
4. In a special nozzle in front of the dosing device;
5. In another unit.

4. Identification of components in GLC can be carried out:
1. By peak retention time;
2. By retention distance;
3. By peak retention volume;
4. By peak area;
5. By peak height.

5. The following are used as mobile phase in GLC:
1. Organic solvents - heptane, hexane, isooctane, etc.;
2. Mixtures of water or aqueous buffer solutions with acetonitrile or methanol;
3. Inert gases - hydrogen, helium, nitrogen, argon, carbon dioxide, air
4. Freons, diethyl ether, isopropanol;
5. Hydrogen sulfide, chlorine, bromine, glacial acetic acid vapor.

EVALUATION OF THE ANSWERS
Final test contains questions with one answer and questions with multiple answer, depending on which for one question with all correct answers, student gets 1 point.
The test grade is given in proportion to the percentage of correct answers:
90-100% - grade "excellent"
80-89% - grade "good"
70-79% - grade "satisfactory"
Less than 70% of correct answers - grade "unsatisfactory".

COMMODITY ANALYSIS DURING RECEIVING PHARMACEUTICAL STOCK

Teachers: assistant Novikov Ya.S.
Building, Department, classroom: Institute of the Pharmacy, 303 (3rd floor)
Contact details:
Telephone number: +7(909)606-08-23 (assistant Novikov Ya.S)
E-mail address: yaroslav.novikov@kazangmu.ru
Office and working hours: Department of management and economics of pharmacy, 313, 9-17

Total hours — 72:

- Lectures 10 hours
- Practical classes 30 hours
- Independent work 32 hours

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=3152).

The purpose of the discipline is to develop in students the skill of conducting acceptance control of incoming medications and other pharmaceutical products and checking accompanying documents in the prescribed manner, including determining acceptance control indicators.

Tasks of the discipline:
1. Studying the features of commodity analysis during receiving pharmaceutical stock.
2. Development of practical skills and abilities to carry out acceptance control of incoming medications and other pharmaceutical products.
3. Developing students' skills and abilities to work with accompanying documents, as well as confirming the quality of the product.
4. Developing in students the skills and abilities to register the results of acceptance control of incoming medications and other pharmaceutical products in the prescribed manner in the accounting documentation.

Course topics:
Calendar plan of lectures
1. The process of supplier selection. Procurement organization of pharmaceutical stock.
2. Requirements for organization receive pharmaceutical stock.
3. Unloading pharmaceutical products from vehicles. Monitoring transportation conditions.
4. Procedure for receiving of pharmaceutical goods into the pharmacy.
5. Procedure for returning goods that have not passed acceptance control to the supplier.

Calendar plan of laboratory classes
1. Features of commodity analysis during acceptance medicines that require special storage and transportation conditions
2. Features of commodity analysis during acceptance of medical products

3. Features of commodity analysis during acceptance of children's and dietary food, mineral water, dietary supplements
4. Features of commodity analysis during acceptance of perfumery and cosmetic products
5. Features of commodity analysis during acceptance care products for newborns and children under 3 years old
6. Features of commodity analysis during acceptance other pharmaceutical products
7. Placement of pharmaceutical products in storage areas

Text books and required supplies:

Pharmacy Management : Essentials for All Practice Settings / Shane P. Desselle, David P. Zgarrick, Greg L. Alston // United States Copyright Act. – 2009. – 652 p.

Pharmacy Management & Leadership Learning Through Case Studies / Steven John Arendt, Mike Millard, & Madeline Fry // Tualatin Books, an imprint of Pacific University Press. – 2018. – 98 p

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

PROPEDEUTIC PRACTICE: INTRODUCTORY PHARMACY PRACTICE EXPERIENCE

Teachers: Ass.Prof. Svetlana Kamaeva
Building, Department, classroom: Amirkhana, 16, Department of Pharmaceutical Technology, 408, 404
Contact details:
Telephone number: 89600801619 (Kamaeva Svetlana)
E-mail address: farm64@bk.ru
Office and working hours: 409 (8-18)

Class hours: 108 h
Total labor of practice is 3 credits, 108 academic hours.
Duration of practice - 12 working days (12 days for 6 hours and 36 hours of independent work).

Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Laboratory practical classes and training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher. Also they contain experimental scientific research activities. It requires the use of special equipment, facilities and materials in classroom. This kind of training to be held in teaching laboratories.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=2534).

Course objectives:
INTRODUCTORY PHARMACY PRACTICE EXPERIENCE is an important step in the pharmacist training and allows students more consciously begin to study specialized subjects and begin the process of development of professional competencies. During the Practice students will get acquaintance with a pharmacy and its functions, with the requirements of sanitary regime, with the organization of the production process of formulations, labeling of drugs, State Pharmacopoeia and rules of prescribing Prescriptions

Main goal of the practice:
The acquaintance of students with a pharmacy and its functions,
The acquaintance of students with the requirements of sanitary regime,
The acquaintance of students with the organization of the production process, labeling of drugs, State Pharmacopoeia and rules of prescribing Prescriptions
the development of professional competencies.

Main task of pharmaceutical practice:

1. Introducing students to the pharmaceutical compounding and dispersing and industrial pharmacy
2. Familiarity with the organization of sanitary regime of pharmacies
3. Familiarity with the workplace and junior pharmaceutical personnel, supporting staff in pharmacy.
4. Familiarity with the organization of jobs in the manufacturing units of simulation center "Educational pharmacy of Kazan State Medical University"
5. The acquisition of professional competences in the field of production activities of pharmaceutical workers in the organization of production of finished drugs.

Tasks of the discipline:

The challenges of propedeutic practice are:

Introducing students to the pharmaceutical compounding and dispensing of drugs and industrial pharmacy

Familiarity with the organization of sanitary regime in pharmacies and developing students' ability to follow the norms of sanitary regime in pharmacies

Familiarity with the workplace of pharmacist and junior pharmaceutical personnel, supporting staff in pharmacy.

Familiarity with the organization of jobs in the manufacturing units of simulation center "Educational pharmacy of Kazan State Medical University"

The acquirement of professional competences in the field of production activities of pharmaceutical workers in the organization of production of finished drugs.

To write final documents on Practice

Course topics: I term

Calendar plan of lectures

1. General familiarity with pharmacy, its structure and functions.
2.The study of the regulatory norms of sanitary regime in pharmacies and rules for preparation non-sterile formulations.
3. The study of the regulatory norms of sanitary regime in pharmacies and rules for preparation sterile formulations in the pharmacy.
4. The study of the regulatory norms of sanitary regime in pharmacies. The study of sterilisation methods. Sanitization of equipment, small pharmaceutical equipment, sanitary clothing, preparing the auxiliary materials.
5. The study of the regulatory norms of sanitary regime in pharmacies. Classification of pharmacy bottles as a packaging material. Washing and cleaning of pharmacy utensil. The study of regime of cleaning and Processing of chemist glassware.
6. Introduction to Pharmacopoeia, it's history. Different types of pharmaceutical formulations
Pharmaceutical Terminology. Definition of Drug substance and Auxiliary substance. Pharmacy scales.
7. The acquaintance with the rules of correct prescribing of prescriptions. Prescriptions on different formulations. Rules for prescribing powders.
8. The acquaintance with the rules of correct prescribing of prescriptions. Prescriptions on different formulations. Rules for prescribing powders.

9. Labeling of final product. Types of labels for drugs. The study Of Minister of Health Order Ns 249n from 2023 year.

Calendar plan of laboratory classes

1. Organizational meeting. Introduction to the practice. A study of teaching materials for the pharmaceutical introductory practice. Passage of instructing of labor protection, safety and fire safety. Compliance with the requirements of the sanitary and pharmaceutical regime in the pharmacy.
2. General familiarity with pharmacy, its structure and functions. Introducing in the organization of production of dosage forms in pharmacy. Familiarity with the rules of work in pharmacies, with the simulation center "Educational pharmacy of Kazan State Medical University" and classrooms of pharmaceutical technology.
3. The study of the regulatory norms of Sanitary regime under the production of non-sterile drug forms. Rules of Sanitary cleaning of premises of pharmacy. Treatment of hands of Pharmacy staff. Familiarity with the organization of work of charwoman (nurses) in pharmacy and washerwoman (nurse-cleaners) in pharmacy.
4. The study of the regulatory norms of Sanitary regime under the production of sterile drug forms. Obtaining of purified water and water for injections in pharmacy.
5. The study of the regulatory norms of Sanitary regime in Pharmacy. Methods of sterilization used in Pharmacy. Sanitization of equipment, small pharmaceutical equipment, sanitary clothing, preparing the auxiliary materials
6. The study of the regulatory norms of Sanitary regime in Pharmacy. Washing and cleaning of pharmacy utensil. The study of regime of cleaning and Processing of chemist glassware. Decision of cases (solving the situational problems).
7. Introduction to Pharmacopoeia. Different types of pharmaceutical formulations. Pharmaceutical terminology. Pharmacy scales.
8. Prescription. Rules for prescribing powders
9. Prescription. Rules for prescribing liquid dosage forms, tablets, ointments etc.
10. Familiarity with design rules for release of drugs and labeling of final product. Different types of labels for drugs.
11. Final Section. Preparing for the competition.

Making reporting documentation on the practice (Note-book of Practice, Report). Preparation of documents, preparation for competition. Set-off at the end of practice.

12. Final Test-Day

<u>Classroom rules:</u>

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

<u>Text books and required supplies:</u>

1.Pharmaceutical technology. Technology of dosage forms : a textbook for students of higher educational institutions / I. I. Krasnyuk, S. A. Valevko, T. V. Mikhailova [et al.] ; ed. I. I. Krasnyuk, G. V. Mikhailova. – 3 rd ed., revised and additional – Moscow : Publishing center «Academy», 2007. – 592 p

2.Pharmaceutical propedeutic practice "introductory pharmacy practice experience": Training guide for educational practice for English-speaking students of the Institute of Pharmacy studied on the specialty 33.05.01 - PHARMACY / Kamaeva S.S., Merkureva G.U. - Kazan: KSMU, 2022.- 50 p.

List of additional literature

1. Federal Law «On the Circulation of Medicines» dated 12.04.2010 N 61-FZ.
2. Order of the Ministry of Health of the Russian Federation of 2023 No. 249n «On approval of the rules for the manufacture and dispensing of drugs for medical use by pharmacy organizations, individual entrepreneurs licensed for pharmaceutical activity».

Evaluation and grading:

Monitoring progress is carried by the end of practice.

Routine performance assessment is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid".

Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student need to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Overall student rating is build up from class attendance, test results, Documents about practice – Diary and Report.

EVALUATION OF THE PRACTICE

The final evaluation of educational practice summed from points for design diary within the sections (divisions):

Day 1 – safety instruction
Day 2 - Pharmacy, structure and pharmacies functions
Day 3 - The position of the sanitary regime instructions under the production of non-sterile drugs
Day 4 - The position of the sanitary regime instructions under the production of sterile drugs
Day 5 - The position of the sanitary regime instructions, study methods of sterilization of drugs
Day 6 - The position of the sanitary regime instructions – processing of Pharmacy utensil
Day 7 – Pharmacopoeia, its history and structure
Day 8 – Prescription
Day 9 – Prescription
Day 10 – Labeling of Drugs

- every day work in simulation center "Educational pharmacy of Kazan State Medical University" and the decision of situational cases must be written in Diary (according the examples) (5 points x 10 sections = 50 points)

Mark for Report design (10 points)
Requirements to the report: report is a student-intern program on the basis of practice, personal observations, results and reflects the ability of a student to a critical analysis of work situations.
The report is structured as follows:
- a brief description of the pharmacy
- a general description of the conditions of practice
- characteristics of the workplace directly
- conducted in a drugstore measures to comply with the requirements of the sanitary regime
- conclusions and suggestions for improving the work of the pharmacy.
The report is issued on the standard sheets of white A4 paper, dated and signed by the student on the last page.

Mark for visiting practice base without gaps (10 points)

Mark for the test items (on Portal) - 20 points;

for an interview or a written answer to a theoretical question (10 points).

Examples of interview questions (written answer)
Sanitary requirements for facilities and equipment pharmacies
Sanitary requirements for pharmacy staff. Training of personnel to work in an aseptic unit
Hand treatment of staff.
Sterilization methods used in pharmacy institution.
Sterilization of packaging glassware bottles.
Heat sterilization of things made of glass, metal, heat resistant polymeric products.
Means and modes of disinfection of various objects (chemical).
Storage in the pharmacy facility, the use and the processing of cleaning equipment.
Handling and storage of footwear personnel are used to working in an aseptic unit.
Processing of plastic stoppers and aluminum caps.

Criteria for evaluation interview questions
9-10 – the mark is "excellent" exposed the trainee if:
student gave a full detailed response with reference to the regulatory document, brilliant student knows the instructions for sanitary regime pharmaceutical organizations.
8 points - evaluation of "good" is set trainee if:
student knows Instruction for the sanitary regime pharmaceutical organizations with small defects
7 points - evaluation of "satisfactory":
the student has a basic understanding of Instruction for the sanitary regime pharmaceutical organizations.
6 points and less - assessment "unsatisfactory":
student does not know Instruction for the sanitary regime of pharmaceutical organizations.

Final Certification of practice conducted according to accepted in Kazan State Medical University rating system.
90-100 points - excellent,
80-89 points - well, good
70-79 points - satisfactory,
69 points or less - unsatisfactory.

PRACTICE ON BOTANY

Teacher: Assistant of Institute of Pharmacy Julia Sprenger
Building, Department, classroom Institute of Pharmacy, 318
Contact details:
Telephone number: 89534827054 (Julia Sprenger)
E-mail address: juliasprenger@yandex.ru

Practice hours: 108 h
Practical classes – 72 hours;
Independent work – 36 hours.

Course description:
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Independent work is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/login/index.php).

Course objectives:
The purpose of the educational practice is to study the structure of plant communities of the Republic of Tatarstan, master the methodology of geobotanical descriptions of phytocenoses, which allows laying the foundations of knowledge about the rational use of natural resources.
Objectives of the educational practice:
- consolidation of theoretical knowledge in the field of botany;
- formation of the ability to use modern technologies in the field of botany;
- acquisition of competencies necessary in the professional activities of a pharmacist.

Course topics:
1. Organizational section.
2. Goals and objectives of the practice.
3. Excursional section.
4. Meadow as a plant community.
5. Forest as a plant community.
6. Swamp as a plant community.
7. Coastal and aquatic vegetation.

8. Ruderal vegetation.
9. Medicinal plants.
10. Completion of individual thematic tasks
11. Offset. Final test.

Content of practice

Goals and objectives of the practice, safety instructions and behavior in nature, receiving individual assignment topics. Introduction to the herbarization technique, plant identification and description.

Conduct a geobotanical description of the meadow: determine the type of meadow,
indicating its location: give a general description, determine the species of plants in this area, indicate their life form

Name the groups of plants in relation to:

a) the light factor;

b) the water factor;

c) the mineral composition of the soil and examples of plants of these groups encountered during the excursion.

Determine which plant families predominate in the meadow.

Name the types of the most common meadows in the Republic of Tatarstan.

Name the medicinal plants of different meadows and the types
of medicinal raw materials obtained from them.

Make a geobotanical description of a forest association.

Identify dominant species in the tree and grass stand. Give a name to the forest association being studied.

Determine the types of relationships between organisms: symbiosis, parasitism, competition, identify which of them prevail.

Compare the studied associations, find common and differences in their structure.

Conduct a morphological description of 2-3 species of forest plants.

Make a list of plants found in the swamp, noting medicinal ones among them.

Write a characteristic on the topic "Swamp vegetation".

Determine the type of water body (pond, lake, river, reservoir, etc.). Describe its banks, water (temperature, odor, color, transparency, acidity) and soil (silt, clay, sand, etc.).

Determining the water temperature. Immerse the thermometer directly into the water body to at least one third of the scale and keep it immersed for at least 5 minutes. Without removing the thermometer from the water, read the readings.

Determining the nature and intensity of the odor. Fill the flask with water to 1/3 of its volume and close the stopper. Shake the contents of the flask vigorously. Open the flask and carefully, inhaling shallowly, immediately determine the nature and intensity of the odor.

The nature of the odor in water can be natural (vague, earthy, putrid, moldy, peaty, fishy) and artificial (gasoline, oil, chlorine, acetic, phenolic).

Determining the color of water. Fill the test tube with water to a height of 10-12 cm. Determine the color of the water by examining the test tube from above on a white background with sufficient side lighting. Select the most appropriate water color option for your case from the following. Water color options: colorless, slightly yellow, light yellow, yellow, intense yellow, brown, red-brown, other.

Determine the species composition of coastal and aquatic plants. Note the belt distribution of vegetation along the shore - reservoir profile. Indicate the tier in which the plants live: the first tier is occupied by above-water plants; the second - plants with leaves floating on the surface of the water; the third - large plants submerged in water; fourth - low bottom plants. Measure the height (for emergent plants), the depth to which the plants enter the water, indicate the phenophase, abundance, life form.

Make several simple observations:

a) take the plant out of the water and pay attention to the arrangement of its organs in space;

b) squeeze the stem of an aquatic plant with your fingers under water, observing the released air bubbles;

c) make a cross-section of the leaf and stem of several coastal and aquatic species and examine the intercellular spaces in the aerenchyma;

Write a characteristic on the topic “Coastal and aquatic vegetation”.

Make a list of species, identify the most numerous families and common species.

Determine the morphological characteristics of weeds: stem height, branching, foliage, number of flowers, fruits.

Characterize the habitat features of roadside and ruderal plants and the ways they adapt to living conditions.

Identify medicinal species from the general list and make morphological descriptions of two species.

Write a description on the topic "Weed-field and ruderal vegetation".

Make a list of ornamental herbaceous plants used for city landscaping. Make a list of introduced tree species used for city landscaping.

Make a list of medicinal plants whose cultivation in open ground is possible in local conditions.

Offset. Final test.

EXAMPLE OF QUESTIONS FOR FINAL TEST

What is the name of this plant?

a. Taraxacum officinale

b. Inula helenium
c. Adonis vernalis
d. Tussilago farfara

Medicinal plant raw material of which plant is it shown below?

a. Calendulae officinalis flores
b. Chamomillae recutita flores
c. Tilia flores

Choose the medicinal use of a plant shown on the picture

a. is used as mild laxative mean

b. is used to treat anxiety and insomnia
c. is used for support liver health
d. is used as diuretic, has anti-inflammatory and detoxifying properties

Set the correspondence between the plants' families and species

Mentha piperita	Asteraceae/Malvaceae/Rosaceae/Lamiaceae/Oleaceae
Achillea millefolium	Asteraceae/Malvaceae/Rosaceae/Lamiaceae/Oleaceae
Tilia cordata	Asteraceae/Malvaceae/Rosaceae/Lamiaceae/Oleaceae
Fraxinus excelsior	Asteraceae/Malvaceae/Rosaceae/Lamiaceae/Oleaceae
Rosa rugosa	Asteraceae/Malvaceae/Rosaceae/Lamiaceae/Oleaceae

Name the plant according to the following description: a large deciduous shrub (up to 6 meters tall) with compound leaves and flat clusters of white flowers, followed by small, dark purple berries
a. Rosa canina
b. Sorbus aucuparia
c. Crataegus sanguinea
d. Sambucus nigra

Evaluation and grading:
Final test contains 25 test questions. Each question of the exam is evaluated by 2, 3, 4, 5 or 6 point depending on the complexity of a question.
Total: (2 x 5) + (3 x 5) + (4 x 5) + (5 x 5) + (6 x 5) = 100 points

Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent". If the test is passed with a score below 68, the answer is considered unsatisfactory and a retake of the exam is assigned.

EDUCATIONAL PRACTICE ON PHARMACOGNOSY
Teachers: Ryumin Sergey Denisovich
Building, Department, classroom: Institute of Pharmacy (Fatiha Amirhana street, 16) classroom 316, The Botanical garden of KSMU, the vicinity of the city of Kazan
Contact details:
- Telephone number: 89655934983 (Ryumin S.D.)
- E-mail address: ryumin-2000@list.ru
- Total hours: 216 h

Field and laboratory classes. Excursions – 144 hours;
Independent work – 72 hours.
Course description:
Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.

Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (http://www.kgmu.kcn.ru:40404/moodle/login/ index.php).__
Course objectives: The purpose of mastering the discipline
The purpose of training practice is to consolidate the theoretical knowledge obtained in the educational process and the acquisition of practical skills and competencies in the field of procurement of medicinal plant raw materials, taking into account the rational use and reproduction of natural resources and mastering the basic techniques of cultivation of medicinal plants.
Objectives of mastering the discipline:
Acquisition of theoretical knowledge on the raw material base of medicinal plants, areas of wild medicinal plants, general principles of harvesting medicinal plant raw materials and measures to protect natural exploited thickets of medicinal plants; basic methods of cultivation of medicinal plants; morphological and anatomical diagnostic signs of medicinal plant raw materials; requirements for packaging, labeling, transportation and storage of medicinal plant raw materials in accordance with regulatory documents; the main ways and forms of using medicinal plant raw materials in pharmaceutical practice and industrial production;
Formation of the ability to recognize medicinal plants by external signs in nature, determine stocks and possible annual volumes of preparations of medicinal plant raw materials, carry out procurement of medicinal plant raw materials, acceptance of MPR and MPP, take samples necessary for analysis; use macroscopic and microscopic analysis methods to determine the authenticity of MPR and MPP; use methods for determining heavy metals, arsenic, pesticides and radionuclides in accordance with state quality standards, legislative and regulatory documents

Course topics:

Section 1. Wild medicinal plants
Topic 1.1. The raw material base of medicinal plants
Topic 1.2. Resource management of medicinal plants
Topic 1.3. Rational use and protection of natural resources of wild medicinal plants
Topic 1.4. Fundamentals of the procurement process of medicinal plant raw materials
Section 2. Cultivated medicinal plants
Topic 2.1. Cultivation of medicinal plants
Topic 2.2. Selection of medicinal plants
Topic 2.3. Introduction and acclimatization of medicinal plants in botanical gardens
Section 3. Ecology and medicinal plants. Ecotoxicants of medicinal plant raw materials.
Topic 3.1. Contamination of MPR with heavy metals and arsenic

Topic 3.2. Contamination of MRP with pesticides
Topic 3.3. Contamination of MRP with radionuclides
Section 4. Processing of medicinal plant raw materials
Topic 4.1. Acceptance of medicinal plant raw materials and sampling methods for analysis
Topic 4.2. Quality control of fresh medicinal plant raw materials: determination of humidity, ash content and juice.
Topic 4.3. Packaging, labeling and transportation of MPR and MPP. Storage of MPR and MPP.
Credit

Text books and required supplies:
Main literature:
1) William Charles Evans Trease and Evans Pharmacognosy/ William Charles Evans – 16 ed.: Saunders Ltd., 2009 — 2075 p.
2) European pharmacopoeia, 11 edition. Access mode: https://pheur.edqm.eu/home
Additional literature:
1. Kurkin V.A. Pharmacognosy: textbook – 2nd ed. additional and revised. - Samara: LLC "Etching", GOVPO "SamSMU Roszdrava", 2007. – 1239 p.
2. Pharmacognosy. Medicinal raw materials of plant and animal origin: a textbook / edited by G.P. Yakovlev. 2nd ed. ispr. and additional – St. Petersburg: SpetsLit, 2010. – 863p.

Evaluation and grading:
Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other)
Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.
Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.
Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – “poor”, 70-79 – “satisfactory”, 80-89 – “good”, 90-100 – “excellent”.
Overall student rating is build up from class attendance, module and test results, midterm assessment results.

SAMPLES OF THE FINAL TEST TASKS OF THE PHARMACOGNOSY TRAINING PRACTICE
Choose one correct answer:
1. ACHILLEA MILLEFOLIUM IS THE LATIN NAME:

1) three-leaf watches 2) three-part series
3) plantain large 4) calamus marsh
5) yarrow

2. TANACETUM VULGARE IS THE LATIN NAME
1) common dandelion 2) common tansy
3) bearberry 4) thyme
5) oregano

3. CHAMOMILE PHARMACY BELONGS TO THE FAMILY
1) Apiaceae 2) Cupressaceae 3) Ericaceae
4) Asteraceae 5) Rosaceae

4. THE COMMON BEAUTY BELONGS TO THE FAMILY:
1) Apiaceae 2) Scrophulariaceae 3) Solanaceae
4) Asteraceae 5) Cupressaceae

5. MEDICINAL MARIGOLDS HAVE AN INFLORESCENCE:
1) flap 2) cob 3) head
4) basket 5) Complex brush

6. MILK THISTLE HAS A SPOTTED FRUIT:
1) leaflet 2) nut 3) achene
4) pod 5) box

7. THE RAW MATERIALS OF THE MEDICINAL DANDELION ARE:
1) flowers 2) leaves 3) roots
4) grass 5) fruits

8. THE RAW MATERIALS OF THE THREE-LEAF WATCH ARE:
1) flowers 2) leaves 3) roots
4) grass 5) fruits

9. ON THE TERRITORY OF RUSSIA, ONLY:
1) St. John's wort IS CULTIVATED 2) marsh marsh
3) chamomile pharmacy 4) peppermint
5) elecampane is high

10. ONLY CULTIVATED IN RUSSIA:
1) Echinacea purpurea 2) oregano
3) aralia Manchuria 4) raspberry
5) calamus of the swamp

11. GROWS ON THE TERRITORY OF RUSSIA:
1) medicinal sage 2) purple foxglove

3) blue cyanosis 4) macleay heart-shaped
5) Echinacea purpurea

12. GROWS ON THE TERRITORY OF TATARSTAN:
1) joster laxative 2) rhodiola rosea
3) milk thistle spotted 4) melissa officinalis
5) madder dye

13. LILY OF THE VALLEY GROWS IN MAY:
1) along the shores of reservoirs 2) on dry meadows
3) in the undergrowth of coniferous forests 4) in swamps
5) in crops of cultivated plants as a weed

14. CALAMUS MARSH GROWS:
1) along the shores of reservoirs 2) in the undergrowth of coniferous forests
3) on dry meadows 4) along the roads, like a roadside weed
5) in crops of agricultural crops, as a weed

15. BY THE METHOD OF ACCOUNTING SITES, THE RESERVES OF RAW MATERIALS ARE DETERMINED:
1) oregano 2) horse sorrel
3) cinnamon rosehip 4) heart-shaped lime
5) buckthorn brittle

16. THE METHOD OF KEY SITES DETERMINES THE RESERVES OF RAW MATERIALS:
1) chamomile pharmacy 2) a series of three-part
3) blue blueberry 4) common bearberry
5) black henbane

17. IN THE RUSSIAN FEDERATION, IT IS PROTECTED:
1) blue blueberry 2) spring goricolor
3) licorice is naked 4) yellow machete
5) Chinese lemongrass

18. IN THE REPUBLIC OF TATARSTAN, IT IS PROTECTED:
1) joster laxative 2) horse sorrel
3) ordinary golden millimeter 4) shepherd's bag
5) common juniper

19. THE RAW MATERIALS OF BUCKTHORN ARE HARVESTED BRITTLE:
1) in spring, during the sap flow period
2) in spring or early summer in the phase of vegetation and growth
3) in summer, in the flowering phase
4) in summer or autumn in the fruiting phase

5) in autumn, at the end of the growing season and the death of the aboveground part

20. THE RAW MATERIALS OF THE HEART-SHAPED LINDEN ARE HARVESTED:
1) in spring, during the sap flow period
2) in spring or early summer in the phase of vegetation and growth
3) in summer, in the flowering phase
4) in summer or autumn in the fruiting phase
5) in autumn, at the end of the growing season and the death of the aboveground part

21. IT CAN BE HARVESTED IN WINTER:
1) viburnum bark 2) dandelion roots
3) rowan fruits 4) birch buds
5) hop copulation

22. WHEN HARVESTING, THE ROOTS ARE CLEANED FROM THE CORK:
1) steelworm 2) elecampane
3) dandelion 4) marshmallow 5) horse sorrel

23. BLUEBERRY FRUITS ARE DRIED IN DRYERS AT
TEMPERATURE NOT EXCEEDING:
1) 20 ° C 2) 40 ° C 3) 60 ° C 4) 80 ° C 5) 100 ° C

24. RHIZOMES WITH VALERIAN ROOTS ARE DRIED IN DRYERS AT A TEMPERATURE NOT EXCEEDING:
1) 20 ° C 2) 40 ° C 3) 60 ° C 4) 80 ° C 5) 100 ° C

25. DRYING IN THE SUN IS ALLOWED:
1) bearberry leaves 2) hawthorn flowers
3) oak bark 4) St. John's wort herbs 5) celandine herbs

26. THEY ARE USED ONLY IN FRESH FORM:
1) fruits of black currant 2) fruits of viburnum
3) aloe tree leaves 4) kalanchoe shoots
5) buckthorn sea buckthorn fruits

27. STORED IN SEPARATE ROOMS:
1) dandelion roots 2) nettle leaves
3) peppercorn grass 4) oak bark
5) chamomile flowers of the pharmacy

28. STORED SEPARATELY ACCORDING TO LIST A:
1) belladonna leaves 2) strophanthus seeds
3) leaves of foxglove woolly 4) ginseng roots
5) rhizomes with roots of hellebore Lobel

29. THE AUTHENTICITY OF MEDICINAL PLANT RAW MATERIALS IS UNDERSTOOD AS ITS COMPLIANCE:
1) numerical indicators 2) expiration dates
3) the timing of the workpiece 4) the main action
5) its name

30. THE DEGREE OF CONTAMINATION OF MEDICINAL PLANT RAW MATERIALS WITH BARN PESTS IS DETERMINED BY:
1) point sample 2) combined sample
3) an average sample 4) a sample for determining microbiological purity
5) a sample specially allocated for this purpose

31. THE CONTENT OF HEAVY METALS IN PLANT RAW MATERIALS ACCORDING TO THE GF RF XIV IS DETERMINED BY THE METHOD:
1) GC with mass spectrometric detection
2) HPLC with mass spectrometric detection
3) Atomic adsorption spectrometry
4) nuclear magnetic resonance on C13 nuclei
5) Proton magnetic resonance

32. WHICH ISOTOPE CONTENT IS NORMALIZED IN PLANT RAW MATERIALS WHEN ANALYZING IT FOR THE CONTENT OF RADIONUCLIDES ACCORDING TO THE GF OF THE RUSSIAN FEDERATION XV:
1) U-238 2) I-131 3) P-32 4) Sr-90 5) Na-24

EDUCATIONAL PRACTICE ON GENERAL PHARMACEUTICAL TECHNOLOGY

Teachers: Ass.Prof. Svetlana Kamaeva
Building, Department, classroom: Amirkhana, 16, Department of Pharmaceutical Technology, 408, 404
Contact details:
Telephone number: 89600801619 (Kamaeva Svetlana)
E-mail address: farm64@bk.ru
Office and working hours: 409 (8-18)

Class hours: 108 h
Course: 4
Term: VIII
Total labor of practice is 3 credits, 108 academic hours. Duration of practice - 2 weeks (12 working days) (72 hours contact work and 36 hours of independent work).

Course description:

Lecture is an oral presentation of particular branch of science or discipline by the teacher. It is usually held for the course of students at the same time.
Laboratory practical classes and training are aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher. Also they contain experimental scientific research activities. It requires the use of special equipment, facilities and materials in classroom. This kind of training to be held in teaching laboratories.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University Distant course of Educational practice on general pharmaceutical technology (industrial technology) on Portal (https://e.kazangmu.ru/course/view.php?id=2572).

Course objectives:
This practice refers to the professional cycle of disciplines, the content of the practice is determined by the Educational Standard. Practice is carried out at the workplaces in the Department of Pharmaceutical Technology and in the production block of the simulation center "Educational Pharmacy of Kazan State Medical University" and with excursions to Enterprise “Tatkhimpharmpreparaty” in Kazan and factory “NanopharmDevelopment” in Kazan, which can ensure the full implementation of the practice program.

Main task of Practice on General Pharmaceutical technology is the participation of students in the acquisition of relevant professional competencies, skills in the manufacture of various dosage forms; as well as the formation, consolidation and deepening of systemic theoretical knowledge, skills, skills obtained in the study of pharmaceutical technology at the university for the development and manufacture of medicines and drugs in various dosage forms.

Main goal of the practice:
The aim of the practice: consolidation of theoretical knowledge obtained in the study of pharmaceutical technology at the university, as well as the formation of professional competencies.
The tasks of Practice on General Pharmaceutical technology are:
1. Acquaintance of students with a pharmaceutical enterprise for the manufacture of finished medicines.
2. Acquaintance with the main tasks and functions of an industrial enterprise,
3. Study of safety rules and principles of labor protection, ecology and production safety.
4. Study of GMP principles in organizing the production of pharmaceutical products.
5. Forming of professional competencies in the field of production activities of pharmaceutical workers in organizing the production of finished medicines.
6.To write final documents on Practice.

After completing an internship in general pharmaceutical technology, a student of the Faculty of Pharmacy must have the following professional competencies.
The student should know:

Regulatory documentation governing the production and quality of medicinal products at pharmaceutical enterprises, the basic requirements for medicinal forms and their quality indicators; List of industrial drugs; List of modern excipients, their properties, purpose; Technology of dosage forms obtained in the conditions of pharmaceutical production; The structure and principles of operation of modern production equipment; The main trends in the development of pharmaceutical technology, new directions in the creation of modern dosage forms and therapeutic systems. The structure and nature of the production activities of a chemical and pharmaceutical enterprise; General methods for the production of drugs and the peculiarities of performing individual technological stages and operations; Occupational health and safety issues, environmental protection at the enterprise. quality control in the production of medicines.

The student should be able to:
Observe the ethical and deontological principles of relationships in professional activities with colleagues, medical professionals and the public; Observe the rules of labor protection and safety measures; Evaluate the technical characteristics of pharmaceutical equipment and machinery; Draw up a material balance for individual components of the technological process; Ensure compliance with the rules of industrial hygiene, environmental protection, labor, safety measures; Draw up instrumental and technological schemes for the production of various medicinal products; Use reference and scientific literature to solve professional problems; Determine the shelf life of finished medicinal products and evaluate the effect of storage conditions and the type of packaging on the stability of dosage forms; Carry out quality control and standardization of various drugs; Organize the production of drugs, observing the requirements of the regulations and other regulatory documents (Normative Documents).

Course topics: VIII term
Calendar plan of Lectures
Obtaining Tablets
Production of ointments
Lecture Production of sterile dosage forms

Calendar plan of Practice
Day 1. Preparatory section. Organizational section.

Organizational meeting. Introduction to the practice. Passage of instructing of labor protection, safety and fire safety. Acquaintance with Factory "Tatkhimfpharmpreparaty". Virtual tour of the enterprise and Enterprise presentation. Issuance of individual tasks to elaborate industrial regulations. Independent work. Filling a Diary of Practice (6 hours).
Day 2. LECTURE Obtaining Tablets. Pharmaceutical packaging. Independent work. Filling a Diary of Practice (6 hours).
Day 3. Excursion to "Tatkhimfarmpreparaty". Acquaintance with the museum of the enterprise. Workshop in the factory for Obtaining Tablets. Acquaintance with the Laboratory of Quality on Factory. Acquaintance with the production of galenic preparations. Filling a Diary of Practice
Day 4. Excursion to the factory "NanopharmaDevelopment". Independent work. Filling a Diary of Practice (6 hours).

Day 5. Excursion to "Tatkhimfarmpreparaty" to the Workshop in the factory for production galenic preparations. Acquaintance with the Laboratory of Quality on Factory. Independent work. Filling a Diary of Practice (6 hours).
Day 6. Implementation of the Individual research work "Development of regulations for the production of a medicinal product". Independent work. Filling a Diary of Practice(6 hours).
Day 7. Acquaintance with the production of purified water and medicinal solutions. Independent work. Filling a Diary of Practice (6 hours).
Day 8. Lecture Production of ointments. Acquaintance with the production of soft drugs (ointments). Production of ointments at "Tatkhimfarmpreparaty". Independent work. Filling a Diary of Practice (6 hours).
Day 9. Acquaintance with the production of soft drugs (ointments). Production of ointments at "Tatkhimfarmpreparaty" (6 hours).
Day 10. Acquaintance with the production of aseptic drugs (injection solutions, infusion solutions, eye drops). Lecture Production of sterile dosage forms. Independent work. Filling a Diary of Practice (6 hours).
Day 11. Acquaintance with the production of aseptic drugs (injection solutions, infusion solutions, eye drops). Independent work. Filling a Diary of Practice (6 hours).
Day 12. Conclusion section
FINAL TEST DAY
Documents for Practice (6 hours).

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Text books and required supplies:

Bykov V.A., Demina N.B., Skatkov S.A., Anurova M.N. Pharmaceutical technology. Lab Guide: Study Guide. - M .: GEOTAR-Media, 2010 .- 304 p.
Minina S.A., Kaukhova I.E. Chemistry and technology of phytopreparations. Textbook for universities / Scientific editor Potselueva L.A. - M .: GEOTAR-MED, 2004 .- 560 p.
Pharmaceutical technology. Technology of dosage forms : a textbook for students of higher educational institutions / I. I. Krasnyuk, S. A. Valevko, T. V. Mikhailova [et al.] ; ed. I. I. Krasnyuk, G. V. Mikhailova. – 3 rd ed., revised and additional – Moscow : Publishing center «Academy», 2007. – 592 p

List of additional literature

1. Federal Law «On the Circulation of Medicines» dated 12.04.2010 N 61-FZ.

2. Order of the Ministry of Health of the Russian Federation of 2023 No. 249n «On approval of the rules for the manufacture and dispensing of drugs for medical use by pharmacy organizations, individual entrepreneurs licensed for pharmaceutical activity».
Industrial technology of drugs: A textbook for students of higher educational institutions: in 2 volumes / Ed. Chueshova V.I. - 2002. – 716 p.
Menshutina N.V., MishinaYu.V., Alves S.V. Innovative technologies and equipment for pharmaceutical production. - M .: Publishing house Binom, 2012 .- T. 1 - 328 p.
Menshutina, N.V. MishinaYu.V., Alves S.V. and other Innovative technologies and equipment for pharmaceutical production. - M .: Publishing house Binom, 2013 .- T. 2 - 480 p.
Official site of JS "Tatkhimpharmpreparaty" Electronic resource // Access mode http://www.tatpharm.ru/

Evaluation and grading:
Monitoring progress is carried by the end of practice.
Routine performance assessment is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”.
Unsatisfactory mark during routine performance evaluation or absenteeism is considered to be a student academic debt. In order to rework the debt the student need to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.
Overall student rating is build up from class attendance (attending practice without skipping), test results, Documents about practice – Diary, Report, individual work, interview cases and TEST .

EVALUATION OF THE PRACTICE
On the Final Test Day each student need to have completed reporting documentation of manufacturing practice.
After completing the internship, the student submits the reporting documentation to the department to the internship curator:
– diary;
Diary is drawn up in a notebook and contains the following sections:
title page;
time sheet
the description of work on the implementation of the manufacturing practice program for the section of the industrial practice program "Manufacturing dosage forms according to prescriptions and the requirements of medical institutions" the student reflects daily in the amount of daily work, and also describes one of the most complex prescription formulations.
It is completed and signed on a daily basis by the mentor-manager indicating the actual time of the student's stay at the workplace, at the end of the practice it is certified by the signature of the pharmacy manager and the seal.

– report;

Requirements to the report: report is a student-intern program on the basis of practice, personal observations, results and reflects the ability of a student to a critical analysis of work situations.

The report is structured as follows:
1) a brief description of the factory
2) a general description of the conditions of practice
3) characteristics of the workplace directly
4) requirements of the production of dosage forms in factory, safety instruction
5) conclusions and suggestions to improve the practice.
The report is issued on the standard sheets of white A4 paper, dated and signed by the student on the last page.
assessment is carried out using 10 point scale, where
0-6 – "poor",
7 – "satisfactory",
8 – "good",
9 – "excellent" and
10 – "splendid".

On Final Test Day students have Test and Interview. Also students need to have Documents on Practice.

Examples of test items
Examples of test items

Choose one or more correct answers.

WHAT COATINGS ARE APPLIED IN CENTRIFUGAL UNITS?
dragee
film
pressed

MEDIUM GRINDING MACHINES
vibrating mills
rod mills
impact mills

AUXILIARY SUBSTANCES IN TABLETED MASS, NO MORE THAN 1%:
purified water
magnesium stearate
starch
microcrystalline cellulose
aerosil

GROUP OF AUXILIARY SUBSTANCES,NOT USED IN THE PRODUCTION OF TABLETS:
fillers
loosening
gluing

antioxidants

Examples of products to elaborate industrial regulations:
Ibuprofen tablets
Tetracycline ointment
Acyclovir tablets
Levomycetine tablets
Levomycetine eye drops
Metronidazole tablets

Examples of theoretical questions for interview.

Administrative and economic structure of "Tatkhimpharmpreparaty". The volume and range of products. Storage conditions for products at the enterprise. Principles of energy and water supply, industrial waste water and methods of their treatment. Environmental protection measures.

Technological process and its components. Material and technical and economic balance of production. ND (industrial regulations, Pharmacopoeia, GOST etc.), their structure and purpose.

Organization of labor protection and safety measures at a pharmaceutical company. Basic provisions of the instruction manualsecurity. Production sites of "Tatkhimfarmpreparaty" requiring compliance with special requirements for labor protection and safety.

Organizational structure, goals and objectives of research laboratories of pharmaceutical enterprises. The activities of the research department for the development of new and improvement of existing methods for the production of drugs, for the development of new dosage forms and new types of packaging for finished products. Stages of development and implementation of regulatory documents for new drugs.

Organization of quality control of finished products at pharmaceutical enterprises. Step-by-step control of the production of medicines at “Tatkhimfarmpreparaty” and the activities of the quality control department for raw materials, semi-finished products and pharmaceuticals. Development of new methods for assessing the quality of finished products.

Structure and product range of the tablet packing plant. The principles of equipment placement and safety precautions in the production areas of the workshop.

Characterization of tablets as a dosage form. Types and nomenclature of tablets. GF XI requirements for the quality of tablets. Modern tests and devices for determining the quality of tablets.

Classification, characteristics and purpose of excipients used in the manufacture of tablets. Nomenclature of excipients used in the production of tablets at OAO Tatkhimfarmpreparaty. Features of the production of tablet preparations in accordance with the range of products.

General technological scheme for producing tablets. Private technological schemes for obtaining tablets according to the nomenclature of products manufactured by “Tatkhimfarmpreparaty”.

General characteristics of the stage of obtaining mass for tableting. Equipment used at this stage and safety precautions when working on it.

SUMMARIZING THE PRACTICE

The results of the practice are summed up according to the rating system adopted by the KazSMU. The rating includes an assessment of the main stages of industrial practice, which makes it possible to assess the formation of competencies:
1.Attending practice without skipping – 10 points
(1 pass – 8 points, 2 passes – 7 points, 3 passes – 6 points, 4 passes – student is not certified).

2. Practice diary – maximum 10 points (from 6 to 10 points).
0-6 – "poor",
7 – "satisfactory",
8 – "good",
9 – "excellent" and
10 – "splendid".
3. Practice report with a maximum score of 10 points (from 6 to 10 points).
0-6 – "poor",
7 – "satisfactory",
8 – "good",
9 – "excellent" and
10 – "splendid".

4. Individual research work – elaboration of industrial regulations for different products – 10 points
0-6 – "poor",
7 – "satisfactory",
8 – "good",
9 – "excellent" and
10 – "splendid".

5.Test control (50 tasks) with the maximum amount of points for testing – 50 points (from 1 to 50 points).

6. Interview on Theoretical question - 10 points (from 6 to 10 points).
assessment is carried out using 10 point scale, where
Criteria for evaluation interview questions
9-10 – the mark is "excellent" exposed the trainee if:
student gave a full detailed response with reference to the regulatory document, brilliant student knows the instructions for sanitary regime pharmaceutical organizations and technology of all dosage forms.
8 points - evaluation of "good" is set trainee if:
student knows Instruction for the sanitary regime pharmaceutical organizations and technology of all dosage forms with small defects
7 points - evaluation of "satisfactory":
the student has a basic understanding of Instruction for the sanitary regime pharmaceutical organizations and technology of all dosage forms.
6 points and less - assessment "unsatisfactory":

student does not know Instruction for the sanitary regime of pharmaceutical organizations and technology of all dosage forms.

The maximum student can score is 100 points.

Final Certification of practice conducted according to accepted in Kazan State Medical University rating system.
90-100 points - excellent,
80-89 points - well, good
70-79 points - satisfactory,
69 points or less - unsatisfactory.

FIRST AID PRACTICE

Teachers: Prof. Ainagul Bayalieva, assistant lecturer Timur Turaev, assistant lecturer Alexander Antonov
Building, Department, classroom # NUK, Anesthesiology and Reanimatology, Disaster Medicine Department, Chair of Department, 5 floor, room 515,516,517,519,521,526
Contact details:
Telephone number: 8(843) 236 05 33 (Prof. Ainagul Bayalieva)
E-mail address: airmk@mail.ru
Office and working hours: 517 (9-17)

Total hours — 108:
- Practical classes 108 hours;

Certification of the practice base.
1. Information about the practice base:

- official name of the institution : State Autonomous Healthcare Institution "Interregional Clinical and Diagnostic Center"

- location address: 420101, RT, Kazan, Karbysheva str., 12a

- information about the head of the institution : General Director of the state autonomous healthcare institution "MKDC" Khairullin R.N. contact phone 7(843) 291-11-77

- information about the basic supervisor (full name, work experience, copy of the order on appointment as the basic supervisor, contact phone number) - Gubaidullin Almaz Foatovich, contact phone number +7 (843) 291-1119, work experience – 16 years

- information about the bed fund required for internship departments:
The hospital has 360 beds, including 220 surgical beds; + 48 intensive care beds:

- neurology - 30 beds,
-neurological department for patients with ONMC-30 beds,
- general surgery - 20 beds,
- cardiac surgery - 40 beds,
- neurosurgery - 60 beds,
- Department of Cardiovascular Surgery – 80 beds,
- three cardiology departments - 80 beds,
- Department of Anesthesiology and Intensive care No. 1 - 15 beds,
- Department of Anesthesiology and Intensive care No. 2 – 12 beds,
- Department of Anesthesiology and Intensive care No. 3 - 15 beds,
- Neurology intensive care unit – 6 beds.

Course description:
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.

Course objectives: The purpose of mastering the discipline
mastering the academic discipline (module) of First aid:
• mastering knowledge of the main issues of pathogenesis and clinical manifestations of pathological conditions developing as a result of accidents and acute therapeutic, surgical, gynecological, nervous diseases in adults and children that threaten the life of the patient (victim) and require first aid, as well as the principles of first aid in these conditions, the algorithm of actions in providing pre-medical care in case of disasters and emergency situations.
• formation and development of competencies among graduates of the specialty "pharmacy" aimed at restoring and improving the health of patients by providing appropriate quality medical care.
• early immersion in the specialty with the formation of the foundations of general cultural and professional skills and competencies under the guidance of a teacher in conditions close to real.
Tasks of the discipline:
To form knowledge in the field of:
The tasks of mastering the discipline:
• to form the fundamental knowledge and skills of providing any emergency medical first aid;
• teach students the principles of diagnosing life-threatening emergencies,
• teach students to perform intensive care activities competently;
• teach students to use standard remedies to temporarily stop bleeding;
• teach students how to inject medicines;
• teach students to apply standard transport tires;
• teach students how to apply bandages to wounds;
• to form fundamental knowledge in the field of clinical toxicology (poisoning) and teach how to use antidotes;
• to inform about the organization and structure of the emergency medical service and to form students' knowledge about the role, place and algorithm of the pharmacist's actions in this structure of emergency care in case of disasters and emergencies;
• teach students the basics of asepsis and antiseptics;
• to teach students the rules of transportation of the sick and injured;

• to teach students the rules of patient care;
• to develop students' stable practical skills in providing pre-medical care for the most common emergency conditions
• to develop students' skills in studying scientific literature and official statistical reviews;
• to develop students' communication skills with the patient, taking into account ethics and deontology, depending on the identified pathology and characterological characteristics of patients;
• to form the student's communication skills with the team.
Course topics:

Calendar plan of practice classes
The subject and objectives of first aid. Methods of clinical examination of the patient and diagnosis of emergency conditions at the prehospital stage. Terminal condition: stages, clinical diagnosis, criteria for assessing the severity of the patient's condition. Sudden cardiac arrest. Cardiopulmonary resuscitation techniques. Electrophysiological foundations of ECG and the technique of ECG registration in 12 leads. Acute respiratory failure. Laryngeal stenosis, cardiac asthma, bronchial asthma, true and false croup: symptoms, differential diagnosis, first aid. Principles of tracheostomy. The technique of performing artificial lung ventilation. Solving situational problems on the topic. Familiarization with the work of the intensive care unit of the cardiology department.
First aid in case of electrical injury, lightning strike, drowning (in fresh, salt water). First aid for heat and sunstroke, fainting, collapse. The concept of cerebral circulatory disorders and the principles of first aid. First aid for allergic reactions: anaphylactic shock, Quincke's edema, urticaria, drug allergy. Solving situational tasks on the topic of the lesson. Patient care (setting jars and mustard plasters). Curation of patients.
First aid for pain syndrome: chest pain, headaches, toothache. The pathophysiology of pain. Clinical symptoms of acute myocardial infarction. First aid for pain syndrome: abdominal pain, lumbar region. The concept of a "sharp stomach". Supervision of patients in the surgical department.
First aid for acute poisoning: household, industrial poisoning, poisoning with vegetable poisons. Poisonous plants and animals of the Volgograd region. First aid for vomiting, hiccups, diarrhea, constipation. Microscopic examination of feces. The concept of "food toxicoinfections". Clinical symptoms of botulism. First aid for feverish conditions. Thermometry technique. Feverish conditions in infectious diseases, in urological patients, in non-communicable diseases. . Patient care (gastric lavage, enema). Solving situational tasks on the topic of the lesson. Curation of patients.
Desmurgy: rules for applying bandages, bandages. Familiarization with the work of the dressing room of the surgical department and performing bandages for patients of the department. First aid for dislocations and fractures. Transport immobilization. Rules for applying tires. Solving situational tasks on the topic of the lesson. Curation of patients.
Asepsis and antiseptics. Wounds: types of wounds, examination of the wounded, first aid Suppuration of wounds. Acute and chronic surgical infection. A specific wound infection. Solving situational tasks on the topic of the lesson. Curation of patients.
First aid for injuries. Closed soft tissue injuries, traumatic brain injuries, chest injuries. Transport immobilization. First aid for burns. The composition of the first aid kit and the purpose of its

main components. Indications, contraindications, side effects of drugs that are allowed to be used in a "home medicine cabinet" without a doctor's appointment (without a prescription). First aid for frostbite, general cooling. Freezing. Care for the seriously ill, hygiene of the patient. Solving situational tasks on the topic of the lesson. Curation of patients.
First aid for bleeding: arterial, venous, capillary, mixed, nasal, internal. Rules for stopping external bleeding. Technique of performing anterior nasal tamponade. The method of determining the blood group and Rh factor. Patient care (methods of performing intradermal and intramuscular injections). Performing IV injections on a phantom..
Outcoming testing. Final test

Text books and required supplies:

a) basic literature:
1. First aid [Text] : textbook. the manual; edited by V. M. Velichenko, G. S. Yumashev; [V. M. Velichenko, G. S. Yumashev, H. A. Musalatov, etc.] . - M. : Medicine , 1989. - 272 p. : ill. - (Educational literature. For students of pharmaceutical institutes) . - 0-80
2. Rogova N. V. First aid [Text] : textbook. a student's manual. III course of pharm. full-time and part-time forms of education / Rogova N. V. ; edited by V. I. Petrov; Ministry of Health of the Russian Federation, VMA, Kaf-ra clinic. pharmacology . - Volgograd : Publishing House of the Volga , 2002 . - 182 p. - Bibliogr.: pp.182 . - 27-96
b) additional literature:
1. Disaster medicine [Text] : textbook. the manual ; edited by V. M. Ryabochkin, G. I. Nazarenko; [author : Yu. V. Aksenov, A. A. Alexandrovsky, T. I. Borovskikh, etc.] . - M. : INI Ltd , 1996. - 262 p. : ill. - (Educational literature. for students of secondary medical schools) . - 26-00 ; 35-50 ; 60-00
2. Emergency care at the prehospital stage/ Zhavoronkov V.F., Antonov A.M..Kazan. :KSMU, 2002-38c.
3. Guidelines for Primary Health Care, 2006 [Text] : with adj. on the CD : for doctors providing primary medical care. Help : [study. a manual for the system of occupational health and safety of doctors] ; chief editors : A. A. Baranov, I. N. Denisov, A. G. Chuchalin ; Assoc. med. ob-v on quality. Moscow : GEOTAR-Media , 2006 . - 1521 p. + 1 CD-ROM. - (National project "Health") . - Prem. Decree : pp. 1535-1521 . - 860-00
4. Nagnibeda A. N. Paramedic of the ambulance [Electronic resource] : practice. guide / Nagnibeda A. N. - St. Petersburg : SpetsLit , 2009 . - Access mode: http://www.studmedlib.ru
5. Levchuk I. P. Medicine of catastrophes [Electronic resource]: a course of lectures / Levchuk I. P., Tretyakov N. V. - M. : GEOTAR-Media , 2011 . - 220 p. - Access mode: : http://studmedlib.ru
6. Kornilov N. V. Traumatology and orthopedics [Electronic resource] : textbook. student's handbook. universities on spec. 020100 Medical business, 020200 Pediatrics / Kornilov N. V., Gryaznukhin E. G., Shapiro K. I., etc. ; edited by N. V. Kornilov. - 2nd ed. St. Petersburg : Hippocrates , 2005. - 538 p. : ill. - (Educational literature for students of medical universities) . - Auth. col. it is indicated on the back of tit. l . - Bibliogr.: pp.533 . - 262-50 - Access mode: : http://studmedlib.ru

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

1. Be respectful
2. Be careful with equipment
3. Be disciplined
4. Be prepared for the classes
5. Be involved, do not hesitate to ask questions
6. Look professional: you have to wear clean white coat and change shoes
7. Eating is allowed only during brakes
8. Using phone is allowed only during brakes

ATTENDANCE REQUIREMENTS

Attendance will be recorded in lecture and seminar journals.

In case of illness or other reasons for which you will not be able to attend classes, you must notify the dean's office and department, provide a medical certificate or permission from the dean's office to miss classes for a good reason. Working off the missed lectures can be carried out on the educational portal. Your tutors will give you specific deadlines for reopening resources. Working off missed seminars will require the fulfillment of all types of practical tasks provided for by the discipline program in these classes.

Students who missed more than 50% of classes will have to retake the discipline.

Students who believe that the assessment of his work was affected by extraordinary circumstances can write a reasoned explanation to the head of the department or to the dean's office.

CURRENT CONTROL

1. Anthropometry (breast circumference measurement, weighing, body length measurement, spirometry).
2. Determination of the frequency of respiratory movements of the patient.
3. Determination and calculation of the pulse in the temporal, carotid, radial, femoral arteries.
2. The technique of measuring systemic blood pressure.
5. Signs of cardiac arrest (the onset of clinical death of the patient).
6. Cardiopulmonary resuscitation. Restoration of the patency of the patient's respiratory tract.
7. Cardiopulmonary resuscitation. Artificial ventilation of the lungs.
8. Cardiopulmonary resuscitation. Artificial blood circulation (closed heart massage).
9. Determination of the effectiveness of resuscitation measures.
10. The technique of ECG registration in 12 leads.
11. ECG-signs of ventricular fibrillation, asystole.
12. First aid for upper respiratory tract foreign body,
13. Principles of tracheostomy.
12. First aid for asthmatic status.
15. Clinical signs of angioedema of Quincke.
16. First aid in case of electrical injury.
17. First aid in case of lightning damage.
18. First aid in case of drowning.
19. First aid for heat and sunstroke.
20. First aid for fainting.
21. First aid in case of collapse.
22. First aid for anaphylactic shock.
23. First aid for chest pain.
22. First aid for abdominal pain.
25. First aid for headaches.
26. Thermometry technique.
27. The method of setting jars, mustard plasters.
28. The technique of setting the exhaust pipe.
29. Patient care (patient hygiene).
30. Patient care (change of underwear, change of bed linen).
31. The technique of supplying oxygen through nasal catheters, through a mask.
32. Gastric lavage technique.
33. First aid for food poisoning.
32. First aid for alcohol poisoning.
35. First aid for carbon monoxide poisoning.
36. First aid for barbiturate poisoning.
37. First aid for snake bites.
38. First aid for an epileptic seizure.
39. Types of wounds. Principles of providing assistance to the wounded.
20. First aid for penetrating chest injury.
21. First aid for penetrating abdominal injury.
22. Specific wound infection. Kinds. Rules of first aid.
23. Rules for applying bandages.
22. The technique of applying bandages to the head and neck.
25. The technique of applying bandages to the chest and shoulder girdle.
26. The technique of applying bandages to the abdomen and pelvis.
27. The technique of applying bandages to the upper and lower extremities.
28. Rules for applying tires.

29. Transport immobilization.
50. First aid for an open fracture.
51. First aid for a closed fracture.
52. First aid for dislocation.
53. Technique of performing intradermal injections.
52. Technique of performing subcutaneous injections.
55. Technique of performing intramuscular injections.
56. The technique of catheterization of the bladder.
57. The method of setting a cleansing enema.
58. The technique of applying a rubber band harness.
59. The technique of applying a cloth tourniquet.
60. The technique of inhalation.
61. The technique of setting a warming compress.
62. The method of determining the patient's blood group and Rh factor.
63. First aid for hemoptysis.
62. First aid for nosebleeds. Technique of performing anterior nasal tamponade.
65. Rules for stopping external bleeding. Kinds. Places of finger compression of the arteries.
66. Clinical signs of internal bleeding.
67. Burns. Assessment of the degree and area of the burn.
68. First aid for thermal burns.
69. First aid for chemical burns (acid, alkali).
70. First aid for electrical injury.
71. Frostbite. Determination of the degree of frostbite. First aid.
72. The composition of the first aid kit.
73. Methods of transporting patients.
72. The method of application of eye drops and nasal drops.
75. Principles and procedure of first aid in childbirth outside the hospital.
76. The concept of asepsis and antiseptics (mechanical, physical, chemical, biological).
77. Caring for a patient with an infectious disease.

In addition, 10 basic practical skills are taken into account, such as:
wound treatment and dressing;
temporary stop of bleeding;
applying bandages to various parts of the body;
transport immobilization of limbs in case of fractures and dislocations;
ensuring the gentle transportation of the injured and seriously ill;
gastric lavage;
setting up jars, mustard plasters, compresses, enemas;
rinsing of the conjunctival sac;
removal of foreign particles from the eyes;
the product of intramuscular and subcutaneous injections

INTERIM CERTIFICATION
The discipline "FIRST AID" ends with an intermediate certification in the form of a test.
The account includes:
The presence of passed tests on all topics and the final test.
The student must have 100% attendance of both lectures and practical classes or work them out by the end of the course of the discipline.
During the passage of the discipline, the student in the journal of practical exercises should have at least 3 marks:

The answer is evaluated during the survey,
Protection of the abstract message,
Answer during the analysis of a situational problem.
Providing an intermediate grade for completing the course.

PRACTICE OF QUALITY CONTROL OF MEDICINES

Teachers: Gordeeva Daria, Nasibullin Shamil
Building, Department, classroom Institute of Pharmacy, Fatykh Amirkhan street, 16, 421 room
Contact details:
Telephone number: +7 (843) 521-16-42 (Ganieva Guzel)
E-mail address: institute.pharmacy@kazangmu.ru
Office and working hours: 201 (9-17)
Total hours: 324 h
-Practical classes: 108 h
-Independent work: 216 h

Course description:
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Laboratory classes contain experimental scientific research activities. It requires the use of special equipment, facilities and materials. To be held in teaching laboratories.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=1962).

Course objectives: The purpose of mastering the discipline

The goals of mastering the practice of quality control of medicines discipline are consolidation of theoretical knowledge acquired in the educational process and acquisition of practical skills and competencies in the field of quality control of medicines and solving specific problems of practical activities of a pharmacist analyst in a pharmacy.
Tasks of the discipline:
study of the duties of a pharmacist-analyst in the workplace;
familiarization with the organization and technical equipment of the pharmacist-analyst's workplace;
performance of work on the preparation of titrated, test and reference solutions;
performance of all types of work related to pharmaceutical analysis of all types of drugs
Course topics:

Calendar plan of laboratory classes

A semester
Briefing on general issues of organizing practice, distribution by practice bases, by types of professional activity, briefing on the design and maintenance of educational documentation for practice.

General familiarization with the pharmacy organization. Briefing on safety precautions. Study of regulatory documents of the pharmacy organization.
Filling of glass tubes in the assistant's room. Analysis of purified water and water for injection. Qualitative analysis
Quality control of perishable and unstable drugs
Quality control of concentrated solutions. Quality control of semi-finished products, in-pharmacy preparation and packaging.
Quality control of liquid dosage forms for internal administration
Quality control of liquid dosage forms for external use. Quality control of ointments, suppositories.
Quality control of eye drops.
Quality control of injection solutions.
Quality control of solid dosage forms
Preparation of titrated solutions from a sample and using fixansals. Preparation of indicator and reagent solutions.
Physical and physicochemical methods of drug quality control.
Chromatographic methods of drug quality control.
Analysis of the information received.
Processing of the information received.
Preparation of a diary and reporting documentation for practice.
Passing a test with a grade.
Text books and required supplies:
Guidelines for industrial practice in quality control

In-pharmacy quality control of perishable and unstable drugs, concentrated and alcohol solutions, 2021

Evaluation and grading:
Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”. Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during breaks
- Using phone is allowed only during breaks

Example of exam ticket
№1
Recipe: Infusirhizomatis cum radicibus Valerianae ex 10,0 – 100,0
Natrii bromidi 0,5
Coffeini- natrii bensoatis 0,4
Misce. Da. Signa. By 1 tablespoon 3 times a day orally

Analyze the manufactured dosage form.
a) Make a plan for the qualitative analysis of the ingredients of the dosage form and suggest analytical methods.
b) Make a plan for the quantitative analysis of the ingredients of the dosage form and suggest analytical methods.
c) Perform a control on the "Description" and a qualitative analysis of the dosage form.
d) Determine the quantitative content of pharmaceutical substances in the dosage form.
e) Explain the analysis results and evaluate the quality of the prepared dosage form.

EVALUATION OF EXAM ANSWER
The question card of the exam paper consists of 5 questions.
Questions 1-5 is evaluated by 20 points.
Total: 20x5 = 100 points.

MANUFACTURING PRACTICE ON PHARMACEUTICAL TECHNOLOGY

Teachers: Ass.Prof. Svetlana Kamaeva
Building, Department, classroom: Amirkhana, 16, Department of Pharmaceutical Technology, 408, 404
Contact details:
Telephone number: 89600801619 (Kamaeva Svetlana)
E-mail address: farm64@bk.ru
Office and working hours: 409 (8-18)

Class hours: 108 h
Course: 5
Term: 10
Total labor of practice is 8 credits, 288 academic hours. Duration of practice - 5 weeks and 2 working days (32 working days) (96 contact hours and 192 hours of independent work).

Course description:
Laboratory practical classes and training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher. Also they contain experimental scientific research activities. It requires the use of special equipment, facilities and materials in classroom. This kind of training to be held in teaching laboratories.
Workshop is usually devoted to detailed study of specific topics and it is being held in each academic group separately. The workshop involves active participation of students in problem discussion. It requires preliminary preparation by the student.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (http://e.kazangmu.ru/course/view.php?id=2839).
Course objectives:
Manufacturing practice "Pharmaceutical technology" belongs to the professional cycle of disciplines. Manufacturing practice "Pharmaceutical technology" is one of the main stages of the educational process.
The purpose of manufacturing practice "Pharmaceutical technology" is the participation of students in the acquisition of relevant professional competencies, skills in the manufacture of various dosage forms; as well as the formation, consolidation and deepening of systemic theoretical knowledge, professional skills, skills obtained in the study of pharmaceutical technology at the university for the development and manufacture of medicines and drugs in various dosage forms.

Manufacturing practice "Pharmaceutical Technology" allows for students to obtain the professional competencies of a pharmacist-technologist. Without practice in a pharmacy, the formation of the competence of a pharmacist-technologist will be impossible. Therefore, full-time students undergo practical training in a pharmacy in the X semester, immediately before the Final State Attestation of graduates, which allows not only to fully acquire professional skills,

but also to recall all the theoretical material on the manufacture of medicines in pharmacies conditions.
Manufacturing practice "Pharmaceutical technology" refers to the professional cycle of disciplines, the content of the practice is determined by the Educational Standard. Manufacturing practice contributes to the development of students' independent work. In the process of passing the practice, students learn to independently select and systematize information on the technology of manufacturing medicines within the framework of the tasks assigned to them; apply the knowledge gained in practice; study pharmaceutical production technology and equipment; develop teamwork skills; fulfill exercises for self-control.
Manufacturing practice on pharmaceutical technology is carried out at the workplace of a pharmacist-technologist in the production block of the simulation center "Educational Pharmacy of Kazan State Medical University" and with excursion to pharmacy organizations of the State Unitary Enterprise “Tattekhmedpharm” in Kazan, which can ensure the full implementation of the manufacturing practice program.

Main goal of the practice:

Main task of pharmaceutical manufacturing practice "Pharmaceutical technology" is the participation of students in the acquisition of relevant professional competencies, skills in the manufacture of various dosage forms; as well as the formation, consolidation and deepening of systemic theoretical knowledge, skills, skills obtained in the study of pharmaceutical technology at the university for the development and manufacture of medicines and drugs in various dosage forms.

Tasks of the discipline:

The challenges of **Manufacturing practice "Pharmaceutical Technology"** are:
study of the duties of a pharmacist-technologist at the workplace;
familiarization with the organization and technical equipment of the pharmacist-technologist's workplace;
execution of works on the preparation of powders, soft dosage forms, aqueous and non-aqueous solutions, sterile dosage forms.
Familiarity with the organization of jobs in the manufacturing units of simulation center "Educational pharmacy of Kazan State Medical University"
The acquirement of professional competences in the field of production activities of pharmaceutical workers in the production of finished dosage forms and various drugs.
To write final documents on Practice

Course topics: X term
Calendar plan of Practice
Day 1. Preparatory section.
Organizational meeting. Introduction to the practice. Passage of instructing of labor protection, safety and fire safety. General acquaintance with the pharmacy. Study of regulatory documents, instructions, regulations for the manufacture, quality control, storage of medicines and sanitary regime in pharmacies (6 hours).

Day 2. Organizational section.

Tasks and functions of the pharmacy, acquaintance with the prescription-production department of the pharmacy. The device and equipment of the production premises of the pharmacy, their purpose and interrelation. Acquaintance with the work of a pharmacist-technologist on taking prescriptions and dispensing drugs made in a pharmacy. Safety briefing.
Acquaintance with the organization of the packing unit's workplace and his duties; types of packaging containers, packaging materials, weighing devices, (device for pharmaceutical manual and tare scales, rules for working with them and weights, methods of dosing by weight of solid, viscous and liquid substances on hand and tare scales), filling machines. Familiarity with weighing and measuring liquid medicinal products, filtration, capping and registration for dispensing (6 hours).

Production section

Days 3- 10.
Manufacturing of powders with hard-to-grind, dye, extracts, poisonous, psychotropic and potent substances. Determination of the quality of grinding and mixing of bulk substances, the choice of packaging material, registration for dispensing of manufactured dosage forms (6 hours x 8 days = 48 hours)

Day 11-18. Manufacturing of aqueous and non-aqueous, including alcohol, oil, glycerin, solutions of medicinal substances in accordance with the instructions dilution of standard liquids; production of suspensions, emulsions, mixtures, water extracts from medicinal plant materials and from concentrate extracts. Manufacturing of non-aqueous solutions (6 hours x 8 days = 48 hours)

Days 19- 21. Manufacturing of soft medicinal forms in pharmacies: ointments, liniment, ointment bases, pastes (6 hours x 3 days = 18 hours)

Days 22-29. Acquaintance with the aseptic conditions for the production of medicinal products, equipment for filtration, sterilization, as well as equipment for receiving, storing and supplying purified water, water for injection to the workplace, study of regulatory documents regulating the sanitary regime of pharmacies. Completion of tasks on the topic: standardization of the composition of medicinal products, the quality of medicinal products and explosives manufactured by medicinal products. Requirements for personal and professional hygiene of employees, rules for cleaning industrial premises. Sanitary measures at the pharmacy. Sanitary requirements for the conditions for the manufacture of non-sterile medicinal products in a pharmacy. Acquaintance and participation in the processing, washing, drying of pharmaceutical dishes, Processing and washing of the burette installation, pharmaceutical pipettes, mortars, stoppers (rubber, glass, polyethylene) (6 hours x 8 days = 48 hours)

Days 30-31. Acquaintance with the organization of the workplace of the pharmacist-technologist for the manufacture and quality control of medicines (12 hours)

Day 32. Final Test-Day (6 hours)

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes
- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

Text books and required supplies:

1.Pharmaceutical technology. Technology of dosage forms : a textbook for students of higher educational institutions / I. I. Krasnyuk, S. A. Valevko, T. V. Mikhailova [et al.] ; ed. I. I. Krasnyuk, G. V. Mikhailova. – 3 rd ed., revised and additional – Moscow : Publishing center «Academy», 2007. – 592 p

2. Kamaeva S.S. Manufacturing practice «Pharmaceutical technology» : training guide for English-speaking students of the Institute of Pharmacy for manufacturing practice «Pharmaceutical technology» / S. S. Kamaeva, G. U. Merkureva ; Kazan State Medical University Ministry of Health of the Russian Federation. – Kazan : KSMU, 2023. – 40 p.

List of additional literature

1. Federal Law «On the Circulation of Medicines» dated 12.04.2010 N 61-FZ.
2. Order of the Ministry of Health of the Russian Federation of 2023 No. 249n «On approval of the rules for the manufacture and dispensing of drugs for medical use by pharmacy organizations, individual entrepreneurs licensed for pharmaceutical activity».

Evaluation and grading:

Monitoring progress is carried by the end of practice.

Routine performance assessment is carried out using 10 point scale, where 0-6 – “poor”, 7 – “satisfactory”, 8 – “good”, 9 – “excellent” and 10 – “splendid”.

Unsatisfactory mark during routine performance evaluation or absenteeism is considered to be a student academic debt. In order to rework the debt the student need to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Overall student rating is build up from class attendance (attending practice without skipping), test results, Documents about practice – Diary, Report, Abstract, Base of Practice characteristic, interview cases and assessment of skills.

EVALUATION OF THE PRACTICE

To the Final Test Day each student need to complete reporting documentation of manufacturing practice

After completing the internship, the student submits the reporting documentation to the department to the internship curator:

– diary;

Diary is drawn up in a notebook and contains the following sections:

title page;
time sheet
the description of work on the implementation of the manufacturing practice program for the section of the industrial practice program "Manufacturing dosage forms according to prescriptions and the requirements of medical institutions" the student reflects daily in the amount of daily work, and also describes one of the most complex prescription formulations.
It is completed and signed on a daily basis by the mentor-manager indicating the actual time of the student's stay at the workplace, at the end of the practice it is certified by the signature of the pharmacy manager and the seal.

– report;

Requirements to the report: report is a student-intern program on the basis of practice, personal observations, results and reflects the ability of a student to a critical analysis of work situations.
The report is structured as follows:
1) a brief description of the pharmacy
2) a general description of the conditions of practice
3) characteristics of the workplace directly
4) conducted in a drugstore measures to comply with the requirements of the sanitary regime
5) conclusions and suggestions for improving the work of the pharmacy.
The report is issued on the standard sheets of white A4 paper, dated and signed by the student on the last page.
assessment is carried out using 10 point scale, where
0-6 – “poor”,
7 – “satisfactory”,
8 – “good”,
9 – “excellent” and
10 – “splendid”.

– abstract for Topic
Example for Topic’s themes.
Topics of essays to be performed during the practice period
1.Technology of dosage forms used in dermatology.
2.Technology of dosage forms with vitamins.
3.Technology of sterile solutions in a pharmacy.
4.Intra-pharmacy preparations in a modern pharmacy.
5.Technology of medicines for newborn babies and children.
6.Technology of dosage forms used in dermatocosmetology.
7.Liquid medicines in the pharmacy's extemporaneous formulation.
8.Aseptically manufactured dosage forms.
9.Drops as a dosage form and their manufacture in a pharmacy.
10.Technology of dosage forms with dye substances in pharmacy conditions.

Practice base passport

The practice base passport is drawn up on standard A4 sheets according to the following scheme:
- Title page (Appendix 3).
- List of attached medical institutions.
- Pharmacy staff.
- Pharmacy plan with a detailed plan of the assistant room and aseptic unit.
- The equipment and means of small mechanization available in the pharmacy.

The student must assess the appropriateness of the layout of the premises, sanitary condition, location and equipment of workplaces.

The passport of the practice base can be illustrated with drawings, photographs. The student signs the last page of the base passport and binds it to the folder.

On Final Test Day students have Test, certification of practical skills and Interview.

Examples of test items

1.If the doctor in the prescription overestimated the dose of a potent substance, then the pharmacist-technologist:

1) will reduce the amount of the drug in accordance with the average therapeutic dose
2) will introduce the substance into the composition of the medicinal product in a dose equal to the highest single dose according to RPh
3) the medicinal product will not be manufactured
4) the substance will be introduced into the composition of the medicinal product in half the dose specified in the State Pharmacopoeia as the highest single dose
5) will introduce the substance in the dosage form at half the dose prescribed in the prescription

2.The process of formation of a soluble complex compound underlies in the production of aqueous solutions of what substances:

1) iodine
2) silver nitrate
3) phenobarbital
4) ethacridine lactate
5) osarsolum

3.High molecular weight medicinal substances that swell infinitely in water include:

1) starch
2) pepsin
3) methylcellulose
4) gelatin
5) protargol

4.For the manufacture of «Glucose solution 40 % – 250.0» for intravenous injections, you should take glucose:

1) 100.00
2) 110.00
3) 111.11
4) 120.00

5) 80.00 34

Examples of theoretical questions for interview.

1.Powders as a dosage form. Manufacturing of powders with difficultto-grind substances, extracts, volatile, odoriferous and coloring substances. Triturations, powders with toxic substances. 2.Aqueous true solutions. Characteristic. Concentrated solutions.

3.Special cases of making solutions. Dilution of standard pharmacopoeial liquids.

4.Concentrated solutions. Manufacturing conditions. Quality control. Strengthening and dilution of concentrated solutions.

5. Potions. Classification. Preparation of mixtures using a burette system.

6.Solutions of substances with High Molecular Weight, colloidal solutions. Their technology.

7.Heterogeneous systems: suspensions, emulsions. Characteristic. Manufacturing in a pharmacy.

8.Aqueous extracts from medicinal plant raw materials. Features of the manufacture of aqueous extracts from raw materials containing tannins, alkaloids, anthraglycosides, essential oils, saponins, cardiac glycosides, mucous substances. Aqueous extracts from concentrate extracts.

9.Non-aqueous solutions. Characteristics of non-aqueous solvents used in drug technology, their classification. Features of the technology of solutions in volatile and non-volatile solvents.

10.Liniments. Classification. Characteristics of the dosage form. Their technology.

Examples of tasks for assessment of skills

Make a medicinal product according to an individual prescription, issue it for dispensing, set the quality criteria for the manufactured product, issue a written control passport and set the expiration date of the manufactured product:

1) Recipe: Infusi rhizomatis cum radicibusValerianae ex 10,0 – 100,0
Natrii bromidi 0,5
Coffeini- natrii bensoatis 0,4
Misce. Da. Signa. By 1 tablespoon 3 times a day orally

2)Recipe: Unguenti Streptocidi 1%-10,0
Da. Signa. To spread on the injured skin

3)Recipe: Solutionis Acidi glutaminici 1%-100,0
Da. Signa. By 1 teaspoon 2 times a day for newborn baby 10 days old

4)Recipe: Solutionis Natrii bromidi 1%-50,0
Da. Signa. By 1 teaspoon 2 times a day for newborn baby 20 days old

5)Recipe: Acidi ascorbinici 0,1
Sacchari 0,2
Misce fiat pulvis
Da tales doses N 5
Signa. By 1 powder 3 times a day orally

SUMMARIZING THE PRACTICE

The results of the practice are summed up according to the rating system adopted by the KazSMU. The rating includes an assessment of the main stages of industrial practice, which makes it possible to assess the formation of competencies:
1.Attending practice without skipping – 10 points
(1 pass – 8 points, 2 passes – 7 points, 3 passes – 6 points, 4 passes – student is not certified).

2. Practice diary – maximum 10 points (from 6 to 10 points).
0-6 – “poor”,
7 – “satisfactory”,
8 – “good”,
9 – “excellent” and
10 – “splendid”.

3. Practice report with a maximum score of 10 points (from 6 to 10 points).
0-6 – “poor”,
7 – “satisfactory”,
8 – “good”,
9 – “excellent” and
10 – “splendid”.

4.Passport of the practice base – maximum 10 points.
0-6 – “poor”,
7 – “satisfactory”,
8 – “good”,
9 – “excellent” and
10 – “splendid”.

5.Abstract – maximum 10 points (from 6 to 10 points).
0-6 – “poor”,
7 – “satisfactory”,
8 – “good”,
9 – “excellent” and
10 – “splendid”.

7.Test control (20 tasks) with the maximum amount of points for testing – 20 points (from 1 to 20 points).

8. Sertification of skills – maximum 20 points:
– determination of the type of dosage form (2 points);
– examination of prescription prescription (2 points);
– calculations (2 points);
– substantiation of the technology of the medicinal product (2 points);
– substantiation of the type of packaging (2 points).
– manufacturing of a medicinal product (2 points);

– passport of written control (2 points);
– labeling of the dosage form for dispensing (2 points);
– quality criteria of the product (2 points);
– shelf life of the manufactured drug (2 points).

9. Interview on Theoretical question - 10 points (from 6 to 10 points).
assessment is carried out using 10 point scale, where
Criteria for evaluation interview questions
9-10 – the mark is "excellent" exposed the trainee if:
student gave a full detailed response with reference to the regulatory document, brilliant student knows the instructions for sanitary regime pharmaceutical organizations and technology of all dosage forms.
8 points - evaluation of "good" is set trainee if:
student knows Instruction for the sanitary regime pharmaceutical organizations and technology of all dosage forms with small defects
7 points - evaluation of "satisfactory":
the student has a basic understanding of Instruction for the sanitary regime pharmaceutical organizations and technology of all dosage forms.
6 points and less - assessment "unsatisfactory":
student does not know Instruction for the sanitary regime of pharmaceutical organizations and technology of all dosage forms.

The maximum student can score is 100 points.

Final Certification of practice conducted according to accepted in Kazan State Medical University rating system.
90-100 points - excellent,
80-89 points - well, good
70-79 points - satisfactory,
69 points or less - unsatisfactory.

MANAGEMENT AND ECONOMICS OF PHARMACY PRACTICE

Teachers: assistant Novikov Ya.S.
Building, Department, classroom: Institute of the Pharmacy, Training Pharmacy (1st floor); chain pharmacy.

Contact details:
Telephone number: +7(909)606-08-23 (assistant Novikov Ya.S.)
E-mail address: yaroslav.novikov@kazangmu.ru
Office and working hours: Department of management and economics of pharmacy, 313, 9-17

Total hours — 216:
- Practical classes 72 hours
- Independent work 144 hours

Course description:
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=2882).

The purpose of mastering the practice of "Management and Economics of Pharmacy": the formation of systematic knowledge, skills and abilities in students in providing qualified, timely, accessible, high-quality pharmaceutical care and in ensuring guarantees of the safety of the use of medicines.

Tasks of the discipline:
1. Acquisition of theoretical knowledge on the organization of the activities of pharmaceutical enterprises and the provision of medicinal care to the population.
2. Formation of skills and competencies in the use of methods of organization and management of enterprises engaged in the field of circulation of medicines.
3. Acquisition of skills and competencies in the implementation of activities related to the sale of medicines in accordance with the requirements of current legal and regulatory documentation.
4. Acquisition of skills and competencies in the organization of financial and economic activities in order to maximize profitability and increase the competitiveness of a pharmacy organization.
5. Development of skills and competencies in the application of basic methods and means of obtaining pharmaceutical information, its storage, processing, compliance with information security requirements.

Course topics:
1. Study of regulatory documents, instructions for the use of drugs, storage of drugs in a pharmacy organization.
2. Familiarization with the structure, staff, premises and equipment of the pharmacy. Completion of an introductory briefing on labor protection and safety.
3. Organization of work: work of a pharmacist-technologist on accepting prescriptions and dispensing drugs.
4. Organization of work: pharmacist-analyst and pharmacist-technologist on quality control of drugs.
5. Organization of work: pharmacist-technologist on the manufacture of in-pharmacy blanks, concentrated solutions, semi-finished products, etc.
6. Organization of work: pharmacist-technologist for dispensing drugs without prescriptions and in the department of finished drugs.
7. Organization of work: on accounting of financial and economic activities of the pharmacy, accounting, monthly report, its relationship with primary accounting, preparation of monthly report, balance sheet, reporting.

8. Organization of work: on departmental and non-departmental control over the activities of the pharmacy; inventory of goods and materials in the pharmacy or small retail outlet.
9. Organization of work: head or deputy head of the department, preparation of periodic reports for the department, head or deputy head of the pharmacy.
10. Familiarization with the organization of informational and educational work.
11. Summarizing the results of mastering practical knowledge, skills and possessions.

Text books and required supplies:

1. Rutter P. Community Pharmacy: Symptoms, Diagnosis and Treatment. 5th ed. Elsevier, 2020. 416 p.
2. Communication Skills in Pharmacy Practice: A Practical Guide for Students and Practitioners (5th Edition) By William N Tindall, Robert S Beardsley and Carole L Kimberlin 2011, 242 p., Lippincott Williams & Wilkins
3. Oxford Handbook of Clinical Pharmacy / edited by Philip Wiffen, Marc Mitchell, Melanie Snelling, Nicola Stoner. – New York : Oxford University Press Inc., 2012. – 695 p
4. Pathology and Therapeutics for Pharmacists. A basis for clinical pharmacy practice / Russell J Greene, Norman D Harris // Pharmaceutical Press. – 2008. – 1009 p.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

- Be respectful
- Be careful with equipment
- Be disciplined
- Be prepared for the classes

- Be involved, do not hesitate to ask questions
- Look professional: you have to wear clean white coat and change shoes
- Eating is allowed only during brakes
- Using phone is allowed only during brakes

PHARMACEUTICAL COUNSELLING AND INFORMING PRACTICE

Teachers: assistant Novikov Ya.S.
Building, Department, classroom: Institute of the Pharmacy, Training Pharmacy (1st floor); chain pharmacy.

Contact details:
Telephone number: +7(909)606-08-23 (assistant Novikov Ya.S.)
E-mail address: yaroslav.novikov@kazangmu.ru
Office and working hours: Department of management and economics of pharmacy, 313, 9-17

Total hours — 144:
- Practical classes 48 hours
- Independent work 96 hours

Course description:
Practical training is aimed to apply theoretical knowledge in practice. The skills are developed in problem solving process under the supervision of a teacher.
Self-study is work with the special literature or teaching materials (literary sources, video and audio material, multimedia programs and simulators) on the educational portal of the University (https://e.kazangmu.ru/course/view.php?id=3151).

The purpose of mastering the practice: obtaining professional skills, abilities and experience of professional activity in the implementation of pharmaceutical counselling and informing during the dispensing of medicines and other pharmaceutical products based on the acquired theoretical knowledge, skills and formed professional competencies.

Tasks of the discipline:
1. Developing skills and gaining experience in independent work in the implementation of pharmaceutical activities related to retail sales, prescription and over-the-counter dispensing of drugs.
2. Developing skills in providing advisory assistance to specialists of medical organizations and the population on issues of effective and safe use of prescription and over-the-counter drugs, as well as medical devices, patient care items and other healthcare products.
3. Familiarizing students with activities to form the motivation of the population to maintain health.
4. Developing in students the skill of complying with the requirements of regulatory documents on the rules for dispensing drugs.

5. Developing skills in studying scientific literature and official statistical reviews. Acquiring practical skills in forming a specific information space about drugs and pharmacy goods, compliance with information security requirements.
6. Developing skills in communicating with a team. Carrying out professional activities in accordance with ethical standards and moral principles of pharmaceutical ethics and deontology.
7. Gaining experience in developing professional communications, skills in providing information and counselling assistance to consumers when choosing over-the-counter drugs and dispensing them.
8. Reinforcing skills in informing consumers in accordance with the instructions for medical use, as well as informing health workers about new drugs, synonyms and analogues, about possible side effects of drugs.
9. Forming skills in providing information and counselling assistance to patients based on the principles of rational use of drugs, taking into account the biopharmaceutical features of dosage forms.

Course topics:

1. Organization of practice: briefing on general issues of organizing practice, distribution among practice bases, among types of professional activity, briefing on the preparation and maintenance of educational documentation for practice.
2. General acquaintance with the pharmacy organization. Safety briefing. Study of information and advertising materials of the pharmacy organization. Study of the assortment.
3. Counselling and informing consumers on over-the-counter dispensing of drugs.
4. Counselling and informing consumers on dispensing drugs according to prescriptions and requirements of medical organizations.
5. Counselling and informing consumers on dispensing individually prepared drugs.
6. Counselling and informing consumers on dispensing drugs containing medicinal plant materials.
7. Counselling and informing consumers on dispensing medical devices and patient care items.
8. Counselling and informing consumers on dispensing cosmetic products.
9. Counselling and informing consumers when dispensing goods for children.
10. Counselling and informing consumers when dispensing biologically active additives.

Text books and required supplies:

Rutter P. Community Pharmacy: Symptoms, Diagnosis and Treatment. 5th ed. Elsevier, 2020. 416 p.
Communication Skills in Pharmacy Practice: A Practical Guide for Students and Practitioners (5th Edition) By William N Tindall, Robert S Beardsley and Carole L Kimberlin 2011, 242 p., Lippincott Williams & Wilkins
Oxford Handbook of Clinical Pharmacy / edited by Philip Wiffen, Marc Mitchell, Melanie Snelling, Nicola Stoner. – New York : Oxford University Press Inc., 2012. – 695 p
Pathology and Therapeutics for Pharmacists. A basis for clinical pharmacy practice / Russell J Greene, Norman D Harris // Pharmaceutical Press. – 2008. – 1009 p.

Evaluation and grading:

Monitoring progress is carried by the end of each module (colloquia/written papers/oral examination/test/laboratory works assessment/abstracts/reports/medical records, reports or other).

Routine performance assessment (homework, laboratory work, tests during classes, etc.) is carried out using 10 point scale, where 0-6 – "poor", 7 – "satisfactory", 8 – "good", 9 – "excellent" and 10 – "splendid". Unsatisfactory mark during routine performance evaluation or absenteeism (including lectures) is considered to be a student academic debt. In order to rework the debt the student can attend missed/failed class with a different academic group (the teacher is to be notified in advance) or to do the rework using e-learning or distance technologies or in other ways determined by the teacher. Abandoned academic debt is leading to dismissal from the University.

Midterm assessment is a form of knowledge and skills evaluation on the discipline or on a part of it (test/oral exam/paper). Grading: 0–69 points – noncredit; 70–100 points – credit. Student is given not more than 2 attempts to pass midterm assessment within one year. Failure is leading to dismissal from the University.

Exams are held in forms of test, problem cases, practical exercises, oral and written questions or their combination. Grading: 0–69 – "poor", 70-79 – "satisfactory", 80-89 – "good", 90-100 – "excellent".

Overall student rating is build up from class attendance, module and test results, midterm assessment results.

Classroom rules:

Be respectful
Be careful with equipment
Be disciplined
Be prepared for the classes
Be involved, do not hesitate to ask questions
Look professional: you have to wear clean white coat and change shoes
Eating is allowed only during brakes
Using phone is allowed only during brakes