



MINISTRY OF SCIENCE AND HIGHER EDUCATION OF RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education

Far Eastern Federal University

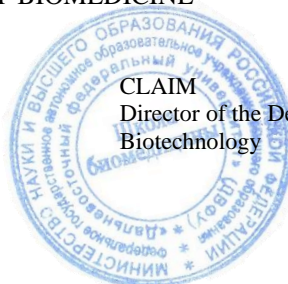
(FEFU)

SCHOOL OF BIOMEDICINE

AGREED
Head of OP

(Signed)

(Full name)



CLAIM

Director of the Department of Medical Biology and
Biotechnology

(Signed)

(Acting Name)

December 06, 2022

WORK PROGRAM OF THE DISCIPLINE

Pharmacology and Toxicology

Direction of training 06.04.01 Biology

(Molecular and Cell Biology)

Form of training: full-time

Course 1 semester 2

lectures 18 h.

practical exercises - hour.

lab work 6 hours

total hours of classroom load 36 hours.

independent work 36 hours.

including 27 hours to prepare for the exam.

exam 2 semester

The work program is drawn up in accordance with the requirements of the Federal State Educational Standard in the direction of training 06.04.01 Biology, approved by the order of the Ministry of Education and Science of Russia dated 11.08.2020 No. 934.

The work program was discussed at the meeting of the Department of Medical Biology and Biotechnology Protocol dated December 06, 2022 No. 2

Director of the Department of Implementing Structural Unit Ph.D., Associate Professor Kumeiko V.V.

Compiled by: Ph.D., Associate Professor Kumeiko V.V.

Vladivostok

2022

Reverse side of the RPD cover page

1. The work program was revised at the meeting of the Department / department / department (implementing the discipline) and approved at the meeting of the Department / department / department (issuing structural unit), the protocol from " _____ № _____

2. The work program was revised at the meeting of the Department / department / department (implementing the discipline) and approved at the meeting of the Department / department / department (issuing structural unit), the protocol from " _____ № _____

3. The work program was revised at the meeting of the Department / Department / Department (implementing the discipline) and approved at the meeting of the Department / Department / Department (issuing structural unit), the protocol from " _____ № _____

4. The work program was revised at the meeting of the Department / Department / Department (implementing the discipline) and approved at the meeting of the Department / Department / Department (issuing structural unit), the protocol from " _____ № _____

5. The work program was revised at the meeting of the Department / Department / Department (implementing the discipline) and approved at the meeting of the Department / Department / Department (issuing structural unit), the protocol from " _____ № _____

1. Goals and objectives of mastering the discipline:

Purpose: students' assimilation of the basic provisions of general pharmacology and pharmacology of individual body systems, mechanisms of action of drugs, knowledge about molecular targets for drugs, development of complex thinking among future specialists that allows predicting the positive and negative aspects of the effects of drugs, as well as their combinations, the formation of the ability to apply the knowledge gained in professional activities.

Tasks:

- to master the basic information on general pharmacology, the mechanisms of action of drugs on biological targets, pharmacokinetics, pharmacodynamics and the use of the main groups of drugs;

- to teach students the basic principles of prescription and prescription writing, the ability to write prescriptions for medicines in various dosage forms and combinations;

- be able to analyze the effect of drugs at the level of the body, organ, cell, subcellular structures and molecules;

- know the principles of action of the main pharmacotherapeutic groups of medicinal substances, the issues of the molecular mechanism of their action and the safety profile;

- determine the indications and contraindications for the appointment of drugs for major diseases;

- take into account the influence of various factors (sex, weight, age, history, concomitant pathology, use of other drugs, etc.) on drug therapy;

- have an idea of drug toxicology and the principles of first aid for acute drug poisoning;

- predict and prevent in time the development of adverse reactions of drugs, based on aspects of the molecular action of drugs.

Professional competencies of graduates and indicators of their achievement:

Task type	Code and name of professional competence (the result of mastery)	Code and name of the competency achievement indicator
research	PC-6 Is capable of developing experimental models, methods of cytological diagnostics, morphometry, marker histo- and cytochemistry, etc.	PC-6.1 Projects and carries out fundamental research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions
		PC-6.2 Develops and critically evaluates experimental research model in cytology and histology

		PC-6.3Exists histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry
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Code and name of the competency achievement indicator	Name of the assessment indicator (the result of training in the discipline)
PC-6.1Projects and carries out fundamental research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions	Knows regularitiesand structure and functioning of cells and tissues in normal, experimental and pathological conditions Can predict and carry out fundamental research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions Owns skills in planning research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions
PC-6.2Develops and critically evaluates experimental research model in cytology and histology	Knows Fundamentals of Cytology and Histology Can develop and evaluate an experimental research model in the field of cytology and histology Owns skills in the development and evaluation of experimental modeland research in the field of cytology and histology
PC-6.3Exists histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry	Knows methods of histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry Can carry out histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry Owns skills in histo- and cytological diagnostics, morphometrics, marker histo- and cytochemistry

1. Labor intensity of discipline and types of training sessions in the discipline
The total labor intensity of the discipline is 2 credited units (72 academic hours), (1 credit unit corresponds to 36 academic hours).

Types of training sessions and work of the student in the discipline are:

Designation	Types of training sessions and work of the student
Lek	Lecture
Lek electr.	
Lab	Labs
Lab Electr.	
WED:	Independent work of the student during the period of theoretical training
including control	Independent work of the student and contact work of the student with the teacher during the period of intermediate certification

Structure of the discipline:

The form of training is full-time.

№	Name of the section Discipline	Se me ster	Number of hours by types of training sessions and work of the student						Intermediate attestation forms
			Lek	Lab	Av e	OK	WE D	Cont rol	
1.	Topic 1-2	2	3	3	-	-	2	4	Exam Questions
2.	Topic 3		3	3	-	-	1	4	
3.	Topic 4-5		3	3	-	-	2	5	
4.	Topic 6-7		33	3	-	-	2	5	
5.	Topic 8		3	3	-	-	1	6	
6.	Topic 9		3	3	-	-	1	3	
	Total:	2	18	18	-	-	9	27	Exam

THE STRUCTURE AND CONTENT OF THE THEORETICAL PART OF THE COURSE

Lectures 18 hours.

Topic 1. General pharmacology. Introduction to pharmacology. Purpose and objectives. History of the formation of domestic and world pharmacology. Aspects of general, molecular and biochemical pharmacology. Scientific approaches to the creation of new drugs. Principles of evidence-based medicine.

Dosing of medicinal substances. Ways of introducing drugs into the body.

Topic 2. General pharmacology. Basic patterns of pharmacokinetics. Influence of internal and external factors on pharmacokinetics of drugs.

Topic 3. General pharmacology. Basic laws of pharmacodynamics. Reactions of the body with repeated administration and sudden withdrawal of drugs.

Interaction of drugs in combined use. Side effects of drugs. The influence of internal and external factors on the pharmacodynamics of drugs. Pharmacogenetics.

Topic 4. Agents affecting the peripheral nervous system. Pharmacology of cholinergic synapses. Cholinomimetic agents. Anticholinesterase drugs. Cholinesterase reactivators. Anticholinesterase blockers: M anticholinergic blockers, ganglioblockers, peripheral muscle relaxants.

Topic 5. Agents affecting the peripheral nervous system. Pharmacology of adrenergic synapses. Adrenomimetic agents. Adrenoblockers, sympatholytics. Drugs affecting purinergic synapses.

Topic 6. Drugs affecting the central nervous system (lecture-visualization). Mediator mechanisms of excitation and inhibition of the central nervous system. Pharmacology of anesthesia. Agents affecting afferent innervation (local anesthetics). Pharmacology of pain. Narcotic analgesics. Opioid receptor antagonists.

Topic 7. Drugs affecting the central nervous system. Pharmacology of hypnotics and anticonvulsants. Antiparkinsonian drugs. Drugs for the treatment of neurodegenerative diseases.

Topic 8. Drugs affecting the central nervous system. Pharmacology of psychodepressing agents: antipsychotics (neuroleptics), anxiolytic (tranquilizers) and sedatives. Normothymic agents.

Topic 9. Drugs affecting the central nervous system. Pharmacological characteristics of antidepressants. Psychostimulants and nootropic drugs. General tonics, adaptogens, actoprotectors. Analeptics.

IV. STRUCTURE AND CONTENT OF THE PRACTICAL PART OF THE COURSE AND INDEPENDENT WORK

Laboratory work 18 hours.

Session 1. Drugs that affect afferent innervation (seminar). Drugs acting in the field of cholinergic synapses. Cholinomimetic agents. Acetylcholinesterase inhibitors. Acetylcholinesterase reactivators.

Session 2. Drugs that affect afferent innervation. Drugs acting in the field of cholinergic synapses. M-anticholinergic blockers. Ganglioblockers. Peripheral muscle relaxants.

Session 3. Drugs that affect afferent innervation (seminar). Drugs acting in the field of adrenergic synapses. Adrenomimetic agent.

Session 4. Drugs that affect afferent innervation. Drugs acting in the field of adrenergic synapses. Adrenergic blockers and sympatholytics.

Session 5. Drugs that affect the central nervous system (seminar). Drugs that affect afferent innervation (local anesthetics). Drugs for anesthesia. Toxicology of ethyl alcohol. Drugs for the treatment of alcoholism.

Session 6. Drugs that affect the central nervous system (seminar). Narcotic analgesics. Opioid receptor antagonists.

Independent work

Sample abstract topics

Tasks of modern pharmacology. Pharmacokinetics and pharmacodynamics. The relationship of pharmacology with natural, biological and medical sciences.

2. The main stages of development of pharmacology. Tasks of pharmacology in the training of a modern doctor.

3. Stages of creation of new drugs. Methods of pharmacology (screening, studies on the whole organism, on isolated organs, at the cellular and subcellular levels, modeling of pathological processes, computer modeling).

4. Clinical trials of new drugs. Legal and ethical issues. Blind control. Double blind control. Placebo. Pharmaceutical Committee of Russia. Pharmacopoeia of Russia.

5. Definition of concepts: dosage form, drug, medicinal substance, drug. Principles of systemic pharmacological classification of drugs.

6. Recipe. Prescription requirements. Documents defining the rules for the dispensing of prescription drugs. Order No. 110 of the Ministry of Health and Social Development of the Russian Federation of February 12, 2007.

7. Pharmacokinetics. Ways of introducing drugs into the body. Comparative characteristics of the routes of administration. Bioavailability.

8. Absorption of medicinal substances from the gastrointestinal tract. Mechanisms of transport of substances through biological membranes. Presystem elimination.

9. Transport of medicinal substances by the blood, distribution in organs and tissues. Circulation circles. Histo-hematic barriers.

10. Metabolism of medicinal substances. Metabolic phases. Phenotypes of metabolism. The main parameters of pharmacokinetic processes (semi-elimination period, clearance, distribution volume). The importance of pharmacokinetic studies for pharmacotherapy.

11. Pharmacodynamics. Issues studied by pharmacodynamics. Interaction of drugs with cells, tissues. Types of receptors. Picks.

12. Types of action of medicinal substances. Primary and secondary pharmacological reactions. Substances agonists, agonists - antagonists, antagonists. Examples.

V. EDUCATIONAL AND METHODOLOGICAL SUPPORT OF INDEPENDENT WORK OF STUDENTS

Recommendations for independent work of students

The purpose of the independent work of the student is to work meaningfully and independently first with educational material, then with scientific information, to lay the foundations of self-organization and self-education in order to instill the ability to further continuously improve their professional qualifications.

The process of organizing the independent work of the student includes the following stages:

- preparatory (setting goals, drawing up a program, preparing methodological support, preparing equipment);
- basic (implementation of the program, the use of methods of information retrieval, assimilation, processing, application, transfer of knowledge, fixation of results, self-organization of the work process);
- final (assessment of the significance and analysis of the results, their systematization, assessment of the effectiveness of the program and methods of work, conclusions on the directions of labor optimization).

In the process of independent work, the student acquires the skills of self-organization, self-control, self-government, self-reflection and becomes an active independent subject of educational activity. Independent work of students should have an important impact on the formation of the personality of the future specialist, it is planned by the student independently. Each student independently determines the mode of his work and the measure of work spent on mastering the educational content in each discipline. He performs extracurricular work according to a personal individual plan, depending on his preparation, time and other conditions.

Methodical recommendations for independent work of students

As the material on the subject of the discipline is mastered, it is planned to perform independent work of students on the collection and processing of literary material to expand the field of knowledge in the discipline under study, which allows you to deepen and consolidate specific practical knowledge gained in classroom classes. To study and fully master the program material on the discipline, educational, reference and other literature recommended by this program, as well as specialized periodicals, are used.

When independently preparing for classes, students take notes on the material, independently study the issues on the topics covered, using the educational literature from the proposed list, periodicals, scientific and methodological information, databases of information networks.

Independent work consists of such types of work as the study of material on textbooks, reference books, videos and presentations, as well as other reliable sources of information; preparation for the zechet. To consolidate the material, it is enough, flipping through the notes or reading it, mentally restore the material. If necessary, refer to the recommended educational and reference literature, write down incomprehensible moments in the questions to understand them in the upcoming lesson.

Preparation for practical exercises. This type of independent work consists of several stages:

1) Repetition of the studied material. For this purpose, lecture notes, recommended basic and additional literature are used;

2) Deepening knowledge on the proposed topics. It is necessary to differentiate the available material in lectures, textbooks in accordance with the points of the plan of the practical lesson. Separately write out unclear questions, terms. It is better to do this in the margins of the lecture notes or textbook. Clarification should be carried out with the help of reference literature (dictionaries, encyclopedic publications, etc.);

3) Drawing up a detailed plan for the speech, or conducting calculations, solving problems, exercises, etc. In preparation for practical exercises, students take notes on the material, prepare answers to the above questions on the topics of practical exercises. In addition to the practical material, students independently study questions on the proposed topics, using educational literature from the proposed list, periodicals, scientific and methodological information, databases of information networks (Internet, etc.).

Requirements for the presentation and design of the results of independent work

There are no special requirements for the provision and design of the results of this independent work.

Control over the implementation of the plan of independent work of students is carried out by the teacher in practical classes by interviewing and by including in the final tasks specified in the lesson from the plan of independent work.

VI. MONITORING THE ACHIEVEMENT OF COURSE OBJECTIVES

No p/n	Supervised sections / topics of the discipline	Achievement indicator code and name	Learning outcomes	Assessment tools	
				current control	Intermediate-accurate certification
1.	Topic 1-3	PC-6.1Projects and carries out fundamental research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions	Knows regularitiesand structure and functioning of cells and tissues in normal, experimental and pathological conditions Can predict and carry out fundamental research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions Owns skills in planning research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions	Poll	Exam Questions
2.	Topic 4-6	PC-6.2Develops and critically evaluates experimental research model in cytology and histology	Knows Fundamentals of Cytology and Histology Can develop and evaluate an experimental research model in the field of cytology and histology Owns skills in the development and evaluation of experimental modeland research in the field of cytology and histology	Test	Exam Questions
3.	Topic 7-9	PC-6.3Exists histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry	Knows methods of histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry Can carry out histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry Owns skills in histo- and cytological diagnostics, morphometrics, marker histo- and cytochemistry	Poll	Exam Questions

VII. LIST OF REFERENCES AND INFORMATION AND METHODOLOGICAL SUPPORT OF THE DISCIPLINE

Main literature

1. Gaevyi, M. D. Pharmacology : uchebnik / M. D. Gaevyi, L. M. Gaevaya ; ed. acad. V. I. Petrova. — Moscow : INFRA-M, 2020. — 454 p. — (Higher education). - ISBN 978-5-16-009135-8. - Text : electronic. - URL: <https://znanium.com/catalog/product/1062312>
2. Ryadnova, T. A. Veterinary pharmacology. Toxicology: educational and methodical manual / Ryadnova T.A., - 2nd ed., supplement. - Volgograd:Volgograd GAU, 2015. - 68 p. - Text : electronic. - URL: <https://znanium.com/catalog/product/615153>
3. Ryadnova, T. A. Toxicology: educational and methodical manual / Ryadnova T. A., - 2nd ed., supplemented - Volgograd: Volgograd GAU, 2015. - 84 p. - Text : electronic. - URL: <https://znanium.com/catalog/product/615156>
4. Marchenko, B. I. Ecological toxicology : uchebnoe posobie / B. I. Marchenko ; Southern Federal University. - Rostov-on-Don; Taganrog : Publishing House of the Southern Federal University, 2017. - 103 p. - ISBN 978-5-9275-2585-0. - Text : electronic. - URL: <https://znanium.com/catalog/product/1021636>
5. Konopleva, E. V. Pharmacology : textbook and practicum for universities / E. V. Konopleva. — 3rd ed., ispr. and add. — Moscow : Izdatelstvo Yurayt, 2021. — 428 p. — (Higher education). — ISBN 978-5-534-15988-2. — Text : electronic // Educational platform Yurayt [site]. — URL: <https://urait.ru/bcode/520596>
6. Konopleva, E. V. Pharmacology : textbook and practicum for secondary vocational education / E. V. Konopleva. — 2nd ed., ispr. and add. — Moscow : Izdatelstvo Yurayt, 2021. — 433 p. — (Professional education). — ISBN 978-5-534-12313-5. — Text : electronic // Educational platform Yurayt [site]. — URL: <https://urait.ru/bcode/511758>
7. Belonogov, I. A. Toxicology and medical protection : uchebnoe posobie / I. A. Belonogov, D. A. Samokhin. — Minsk : Vysheisha shkola, 2014. — 415 c. — ISBN 978-985-06-2411-6. — Text : electronic // Digital educational resource IPR SMART : [site]. — URL: <https://www.iprbookshop.ru/35557.html>
8. Toxicology and medical protection / A. N. Grebenyuk, N. V. Aksenova, A. E. Antushevich [et al.] ; edited by A. N. Grebenyuk. — Sankt-Peterburg : Foliant, 2016. — 672 c. — ISBN 978-5-93929-263-4. — Text : electronic // Digital educational resource IPR SMART : [site]. — URL: <https://www.iprbookshop.ru/60949.html>
9. Pospelov, N. V. Osnovy obshchestvennoi toxicologii : uchebnoe posobie / N. V. Pospelov. — Moscow : Moskovskaya gosudarstvennaya akademiya

vovodnogo transporta, 2012. — 88 p. — Text : elektronnyi // Fillektsi obrazovatel'nyi resurs IPR SMART : [site]. — URL: <https://www.iprbookshop.ru/46496.html>

10. Lebedeva, S. N. Osnovy toxicologii : uchebnoe posobie / S. N. Lebedeva. — Saratov : AI Er Media, 2018. — 64 c. — ISBN 978-5-4486-0206-1. — Text : electronic // Digital educational resource IPR SMART : [site]. — URL: <https://www.iprbookshop.ru/72455.html>

Further reading

1. Substances affecting the central nervous system: a textbook for medical specialties of universities / V. V. Kodintsev. - M. : Vladivostok : Izd-vo Dalnevostochnogo federal'skogo universiteta, 2019. - 141 p.

<https://elib.dvfu.ru/vital/access/manager/Repository/vtls:000875053>

2. Thesetasks in pharmacology / A. I. Vengerovsky, O. E. Vaizova, T. M. Plotnikova, Uchebnoe posobie. - Moscow : GEOTAR-Media, 2020. - 411 p.

<https://lib.dvfu.ru/lib/item?id=chamo:885749&theme=FEFU>

1. Pharmacology : textbook / ed. by R. N. Alyautdin. - 5-e ed., pererab. i dop. - M. : GEOTAR-Media, 2016. - 1104 p. : ill. - ISBN 978-5-9704-3733-9.

<https://lib.dvfu.ru/lib/item?id=chamo:818902&theme=FEFU>

List of resources of the information and telecommunication network "Internet"

1. <http://elementy.ru/> – scientific electronic library
2. <http://zhelezyaka.com/>
3. <http://science.km.ru/> - electronic resource on different sections of biology
4. <http://molbiol.ru/> - Electronic Resource on Molecular Biology
5. <http://humbio.ru/humbio/cytology/00000d33.htm>
6. <http://biology-of-cell.narod.ru/>
7. http://webembryo.narod.ru/cel_biol.htm
8. <http://tsitologiya.ru/>
9. <http://www.ncbi.nlm.nih.gov/sites/entrez?db=books>

List of information technologies and software

1. Microsoft Office Professional Plus 2010.
2. An office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.).
3. 7Zip 9.20 is a free file archiver with a high degree of data compression.
4. ABBYY FineReader 11 – software for optical character recognition.
5. Adobe Acrobat XI Pro – a software package for creating and viewing electronic publications in PDF format.

6. ESET Endpoint Security – comprehensive protection for Windows-based workstations. Virtualization support + new technologies.

7. WinDjView 2.0.2 – a software to recognize and view the files with the same format DJV and DjVu.

8. Auslogics Disk Defrag – a software to optimize the PC and fine-tune the operating system.

VIII.METHODICAL INSTRUCTIONS FOR MASTERING THE DISCIPLINE

In the process of studying the discipline "Molecular Biology", a variety of methods and means of mastering the educational content are offered: lectures, seminars-colloquia, testing, independent work of students.

The lecture is the main active form of classroom classes, explanations of the fundamental theoretical sections, which involves intensive mental activity of the student. The lecture is cognitive, developmental, educational and organizing in nature. The lecture notes help to assimilate the theoretical material of the discipline. When listening to the lecture, it is necessary to note its rubrication, terminology, keywords, definitions, formulas, graphic schemes.

When working at home with lecture notes, it is necessary to use the main textbook and additional literature that are recommended for this discipline.

When presenting a lecture course, the following are used as forms of interactive learning: lecture-conversation, lecture-visualization, which are built on the basis of previous knowledge, including related disciplines. Presentations, an interactive whiteboard, tables, and diagrams are used to illustrate. In the course of the presentation of the lecture material, problematic and provoking questions are raised, elements of discussion are included.

Lecture-visualization. The lecture is accompanied by a computer presentation with basic texts (headings, formulations, keywords and terms), illustrations of microscopic and ultramicroscopic images of cells, drawing diagrams and writing formulas on an interactive whiteboard, visual tables and slides are demonstrated, which contributes to a better perception of the material presented.

Lecture-conversation - "dialogue with the audience" - is a common form of interactive learning and allows you to involve students in the educational process, as it creates direct contact of the teacher with the audience. Students are asked questions of a problematic, provoking or informational nature. Students themselves can also ask questions. Any of the students can offer his answer, another can supplement it. This form of lecture allows you to involve all students in the work,

activate their attention, thinking, gain collective experience, learn to formulate questions.

Seminar-colloquium. Colloquium is a collective form of consideration and consolidation of educational material. Colloquiums are one of the types of practical classes designed for in-depth study of the discipline, are held in an interactive mode. In classes on the topic of the colloquium, issues are analyzed, together with the teacher, their discussion is held, which is aimed at consolidating the material, forming the skills to conduct polemics, developing independence and critical thinking, the ability of students to discuss them. navigate in large information flows, develop and defend their own position on problematic issues of the academic discipline.

As methods of interactive learning at colloquia, the following are used: a detailed conversation, discussion, press conference.

A detailed conversation involves the preparation of students for each issue of the lesson plan with a single list of recommended mandatory and additional literature for all. Reports are prepared by students on a pre-proposed topic.

Discussion in a group has a number of advantages. Discussion can be caused by the teacher during the lesson or planned in advance by him.

Control tests. Blank or computer testing is used in the mode of selecting the correct answers, establishing the correspondence of concepts, marking details on diagrams, etc.

Methodical instructions for working with literature

An initial list of sources should be compiled. The basis may be the list of references recommended in the work program of the course. For the convenience of work, you can make your own file cabinet of selected sources (surname of the authors, title, characteristics of the publication) in the form of a working file in the computer. Such a file cabinet has an advantage, because it allows you to add sources, replace one with another if necessary, the Initial list of references can be supplemented using the electronic catalog of the FEFU library.

Working with literature on a particular topic, it is necessary not only to read, but also to learn the method of its study: make a brief summary, an algorithm, a scheme of the material read, which allows you to quickly understand it, remember it. It is not recommended to rewrite the text verbatim.

IX. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE

Training sessions on the discipline are held in rooms equipped with appropriate equipment and software.

The list of material and technical and software of the discipline is given in the table.

Logistics and Software Discipline

Name of special premises and premises for independent work	Equipment special premises and rooms for independent work	List of licensed software. Details of the supporting document
Laboratory auditorium equipped with a multimedia complex Vladivostok, Russky Island, Ajax village, 10, aud. M420, area 74,6 m ²	<p>Screen with electric drive 236 * 147 cm Trim Screen Line; Projector DLP, 3000 ANSI Lm, WXGA 1280x800, 2000:1 EW330U Mitsubishi; Subsystem of specialized fasteners of equipment CORSA-2007 Tuarex; Video switching subsystem: DVI DXP 44 DVI Pro Extron matrix switch; DVI twisted pair extender DVI 201 Tx/Rx Extron; Subsystem of audio switching and sound amplification; acoustic system for ceiling mounting SI 3CT LP Extron; digital audio processor DMP 44 LC Extron; extension for IPL T CR48 control controller</p> <p>Aqua distiller PE-2205 (5l/h); Analytical scales Acculab ATL-2200d2-I; Laboratory scale Vibra SJ-6200CE (LSE=6200 g/0,1 g); Moisture meter AGS100; Dual-beam spectrophotometer UV-1800 manufactured by Shimadzu; Rotary evaporator Hei-VAP Advantage ML/G3B; Magnetic stirrer PE-6100 (10 pcs); Magnetic stirrer PE-6110 M with heating (5pcs); Electric heating tiles; Infrared spectrophotometer IRAffinity-1S with Fourier; Form for the formation of suppositories for 100 cells; Pharmaceutical refrigerator; Liquid chromatograph LC-20 Prominence with spectrophotometric and refractometric detector; Laboratory centrifuge PE-6926 with a rotor of 10×5 ml, a set of automatic dosers Ecochem, a set of porcelain mortars, manual machines for packing capsules in size "0", "00", "1".</p>	-
Reading rooms of the FEFU Scientific Library with open access to the fund (building A – level 10)	<p>HP All-in-One 400 All-in-One 19,5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW, GigEth, Wi-Fi, WT, usb kbd/mse, Win7Pro (64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty Internet access speed 500 Mbps. Workplaces for people with disabilities are equipped with Braille displays and printers; equipped with: portable devices for reading flat-printed texts, scanning and reading machines video magnifier with the ability to regulate color spectra; magnifying electronic magnifiers and ultrasonic markers</p>	-
Laboratory auditorium Vladivostok, Russky Island, Ajax village, 10, aud. L406, area 30 m ²	<p>Aqua distiller PE-2205 (5l/h); mixer; Laboratory scale AGN100; Magnetic stirrer PE-6100 (5 pcs); Magnetic stirrer PE-6110 M with heating (2 pcs);</p>	-

	Electric heating tiles; a set of laboratory utensils, a set of porcelain mortars with pistils.	
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X. VALUATION FUNDS

Code and name of the competency achievement indicator	Name of the assessment indicator (the result of training in the discipline)
PC-6.1 Projects and carries out fundamental research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions	<p>Knows regularities and structure and functioning of cells and tissues in normal, experimental and pathological conditions</p> <p>Can predict and carry out fundamental research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions</p> <p>Owens skills in planning research in the field of studying the patterns of structure and functioning of cells and tissues in normal, experimental and pathological conditions</p>
PC-6.2 Develops and critically evaluates experimental research model in cytology and histology	<p>Knows Fundamentals of Cytology and Histology</p> <p>Can develop and evaluate an experimental research model in the field of cytology and histology</p> <p>Owens skills in the development and evaluation of experimental model and research in the field of cytology and histology</p>
PC-6.3 Existents histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry	<p>Knows methods of histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry</p> <p>Can carry out histo- and cytological diagnostics, morphometry, marker histo- and cytochemistry</p> <p>Owens skills in histo- and cytological diagnostics, morphometrics, marker histo- and cytochemistry</p>

The following assessment tools are used for discipline:

1. Poll
2. Testing

Oral questioning.

Oral questioning allows you to assess the knowledge and logic of the student, the ability to use terminology, speech skills and other communication skills.

The training function is to identify details that for some reason were not sufficiently understood during the training sessions and in preparation for the test.

A survey is a means of control, organized as a special conversation of the teacher with the student on topics related to the discipline being studied, and designed to clarify the amount of knowledge of the student on a certain section, topic, problem, etc.

Examples of topics for oral inquiry

1. Problems of modern pharmacology. Pharmacokinetics and pharmacodynamics. Connection of pharmacology with natural, biological and medical sciences.
2. The main stages of development of pharmacology. Tasks of pharmacology in the training of a modern doctor.
3. Stages of creation of new drugs. Methods of pharmacology (screening, studies on the whole organism, on isolated organs, at the cellular and subcellular levels, modeling of pathological processes, computer modeling).
4. Clinical trials of new drugs. Legal and ethical issues. Blind control. Double blind control. Placebo. Pharmaceutical Committee of Russia. Pharmacopoeia of Russia.
5. Definition of concepts: dosage form, drug, medicinal substance, drug. Principles of systemic pharmacological classification of drugs.
6. Recipe. Prescription requirements. Documents defining the rules for the dispensing of prescription drugs. Order No. 110 of the Ministry of Health and Social Development of the Russian Federation of February 12, 2007.
7. Pharmacokinetics. Ways of introducing drugs into the body. Comparative characteristics of the routes of administration. Bioavailability.
8. Absorption of medicinal substances from the gastrointestinal tract. Mechanisms of transport of substances through biological membranes. Presystem elimination.
9. Transport of medicinal substances by the blood, distribution in organs and tissues. Circulation circles. Histo-hematic barriers.
10. Metabolism of medicinal substances. Metabolic phases. Phenotypes of metabolism. The main parameters of pharmacokinetic processes (semi-elimination period, clearance, distribution volume). The importance of pharmacokinetic studies for pharmacotherapy.
11. Pharmacodynamics. Issues studied by pharmacodynamics. Interaction of drugs with cells, tissues. Types of receptors. Picks.
12. Types of action of medicinal substances. Primary and secondary pharmacological reactions. Substances agonists, agonists - antagonists, antagonists. Examples.
13. The main and side effect of medicinal substances. Resorptive action. Direct and reflexive. Selective, reversible and irreversible action. Meaning. Examples.
14. Combined effect of medicinal substances. Additive and potentiated synergy. Meaning. Examples.
15. Types of antagonism. Pharmaceutical and pharmacological

Antagonisms. Meaning. Examples.

16. Repeated administration of medicinal substances (dependence, tolerance, tachyphylaxis, sensitization). Compatibility Test organism with a drug. Examples.

17. Cumulation of medicinal substances and its types. Mechanisms of cumulation. Meaning. Examples.

18. The concept of the dose. Types of doses. Dosing of medicinal substances. Calculation of doses depending on the sex, age, weight of the patient. Examples.

19. Dependence of the action of medicinal substances on the individual characteristics of the body (sex, age), the presence of concomitant diseases, functional state. Examples.

20. Types of drug therapy (etiotropic, pathogenetic, symptomatic, replacement, prophylactic). Examples.

21. Rational prescription of drugs. Polypharmacy. Taking medications taking into account the time of meals. The main aspects of chronopharmacology.

22. Negative effect of medicinal substances on the body. Idiosyncrasy. Side effects of allergic and non-allergic nature. Carcinogenic effect. Etiology and pathogenesis of complications of pharmacotherapy.

23. The effect of medicinal substances on the fetus. Embryotoxic, teratogenic, fetotoxic, mutagenic effect. Features of the appointment medications for pregnant women.

24. The main groups of substances that cause poisoning; Principles of therapy for acute poisoning: a) methods of antidote therapy; b) methods of accelerated removal of toxic substances from the body; c) methods of symptomatic (maintenance) therapy.

Testing.

Testing is the most effective and objective form of assessing knowledge, skills and abilities, which allows to identify not only the level of educational achievements, but also the structure of knowledge, the degree of its deviation from the norm. Testing involves a standardized, verified procedure for collecting and processing data, as well as their interpretation, allows you to check the knowledge of students on a wide range of issues. Testing excludes the subjectivity of the teacher, both in the process of control and in the assessment process.

Halogen-containing antiseptics include:

1. Hydrogen peroxide
 2. Boric acid
 3. Chlorine and iodine preparations
 4. Furatsilin
2. Oxidants include:

1. Furatsilin
2. Ethyl alcohol
3. Hydrogen peroxide
4. Ethacridine lactate
5. Potassium permanganate
3. A remedy from the group of detergents:
 1. Furatsilin
 2. Brilliant green
 3. Alcohol solution of iodine
 4. Cerigel
4. Nitrofurans derivatives include:
 1. Dermatol
 2. Furatsilin
 3. Ethacridine lactate
 4. Brilliant green
5. Preparations of silver and mercury belong to the group:
 1. Detergents
 2. Alcohols and aldehydes
 3. Oxidizing agents
 4. Metal compounds
6. Means from the group of dyes:
 1. Furatsilin
 2. Alcohol solution of iodine
 3. Brilliant green
 4. Boric acid
7. Cleavage of atomic oxygen explains the action:
 1. Ethyl alcohol
 2. Hydrogen peroxide
 3. Chloramine B
 4. Potassium permanganate
8. Sulfhydryl groups of enzymes of microorganisms block:
 1. Oxidizing agents
 2. Dyes
 3. Metal compounds
 4. Halogen-containing compounds
9. The principle of antiseptic action of ethyl alcohol:
 1. violation of protein synthesis of microorganisms
 2. Dehydration of protoplasm protein microorganisms
 3. Oxidation of protein microorganisms

10. Indications for the use of brilliant green:

1. Current disinfection
2. Processing of copper tools
3. treatment of pustular skin diseases
4. Treatment of burns
5. Treatment of postoperative sutures

11. Alcohol solution of iodine is used for:

1. Treatment of the surgical field and the hands of the surgeon
2. treatment of pustular skin diseases
3. Treatment of wound edges
4. Disinfection of medical instruments

12. For disinfection of secretions of infectious patients, the following are used:

1. Xeroform
2. Furatsilin
3. Chloramine B
4. Ammonia

13. Furatsilin is used to treat:

1. Skin diseases and scabies
2. Hand treatment of medical personnel and operating field
3. Disinfection of patient care items
4. treatment of purulent wounds

14. For current disinfection apply:

1. Furatsilin
2. Chloramine B
3. Potassium permanganate
4. Ethyl alcohol

15. Ethyl alcohol in a concentration of 70% is used:

1. for the treatment of mucous membranes, treatment of purulent wounds, burns

2. For hand decontamination, surgical field
3. For decontamination of medical instruments and care items

16. Mercury dichloride (sulema) is used for:

1. treatment of purulent wounds
2. treatment of skin diseases, scabies
3. Treatment of scratches, abrasions
4. Handling linen, nursing items

17. For the treatment of parasitic skin diseases (scabies, lichen) apply:

1. Furatsilin

2. Formaldehyde
3. Potassium permanganate
4. Birch tar

18. Silver nitrate is used for:

1. Current disinfection
2. Wound treatment
3. treatment of skin diseases
4. Cauterization of excessive granulations, warts

19. Promotes tissue granulation and wound healing antiseptic:

1. Brilliant green
2. Furatsilin
3. Boric acid
4. Birch tar

20. For water disinfection apply:

1. Boric acid
2. Chloramine B
3. Pantocide
4. Silver nitrate

21. For the primary treatment of the wound are used:

1. Hydrogen peroxide
2. Furatsilin
3. Silver nitrate
4. Potassium permanganate

22. For the treatment of the oral cavity and mucous membrane of the throat for infections of any etiology, the following are used:

1. 3% hydrogen peroxide solution
2. furatsilina solution
3. Silver nitrate
4. Hexoral

23. Hexoral is characterized by:

1. selectivity of antimicrobial action
2. indiscriminate antimicrobial action
3. used for disinfection of instruments, premises and secretions of patients
4. Used to destroy pathogens on the mucous membranes of the mouth and

throat

24. Antiseptic, contraindicated in infants:

1. Boric acid
2. Furatsilin
3. Potassium permanganate

4. Brilliant green
25. Drugs used to kill microorganisms on the skin and mucous membranes:
 1. Disinfectants
 2. Antiseptic
 3. Chemotherapeutic
 4. Antimicrobial

Test Evaluation Criteria

evaluation	50-60 points (unsatisfactory)	61-75 points (satisfactory)	76-85 points (good)	86-100 points (excellent)
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Methodological recommendations that determine the procedures for assessing the results of mastering the discipline

Assessment tools for intermediate attestation

Intermediate certification of students in the discipline is carried out in accordance with local fefu regulations and is mandatory. The form of reporting on the discipline is an exam.

Methodical instructions for passing the exam

The exam is taken by the leading teacher (associate professor, professor), for whom this type of educational load is assigned in an individual plan. The form of the exam is oral.

The time allowed to the student to prepare for the answer to the exam should be no more than 40 minutes. After this time, the student should be ready to respond.

The presence at the examination of unauthorized persons (except for persons carrying out the inspection) without the permission of the relevant persons (rector or vice-rector for academic affairs, director of the School, head of the OBOR or director of the department) is not allowed. Disabled persons and persons with disabilities who do not have the opportunity to move independently are allowed to take the exam with accompanying persons.

With an intermediate assessment, students are given a grade of "excellent", "good", "satisfactory" or "unsatisfactory". If the student does not appear for the exam, an entry "did not appear" is made in the statement.

Exam Questions

1. Pharmacology as a science. Its components: pharmacodynamics and pharmacokinetics.

2. Molecular pharmacologists as a branch of pharmacology. Primary and secondary pharmacological reactions. A target molecule for a drug substance.
3. The role of foreign and Russian scientists in the development of pharmacology.
4. Principles of creation of new medicinal substances. Directed search for biologically active compounds.
5. The concept of therapeutic, toxic, main and side effects of a medicinal substance.
6. Direct, indirect and side effects of medicinal substances
7. The basic concepts of the formulation: medicinal raw materials, a medicinal substance, a dosage form, a drug, a drug.
8. Dose, types of doses. Doses in experimental pharmacology and medical formulation
9. Types and nature of the action of medicinal substances
10. Ways and means of introducing medicinal substances into the body.
11. Pharmacokinetics. Absorption, transport, distribution and excretion of medicinal substances.
12. The concept of cumulation. Addiction and addiction to medicinal substances.
13. Combined effect of medicinal substances: synergy and antagonism, their types.
14. Tolerance to medicinal substances. Mechanisms of its development.
15. Transport of medicinal substances by the blood system and through biological membranes.
16. Biotransformation as the first phase of the metabolism of medicinal substances in the body.
17. Conjugation as the second phase of the metabolism of drugs in the body.
18. Intracellular receptors. Their participation in the cell's response to the drug substance
19. Receptors of plasma membranes, their participation in the development of the cell's response to the drug substance.
20. The role of membrane proteins and lipids in the mechanism of action of medicinal substances.
21. Physicochemical bases of interaction of drugs with receptors. Theories of reception of pharmacological substances.
22. The role of secondary messengers in the action of medicinal substances.
23. Basics of medical formulation. Solid dosage forms.
24. Basic concepts of the recipe. Soft dosage forms.

25. Basic concepts of the recipe. Liquid dosage forms.
26. Structure and functioning of the cholinergic synapse. Pharmacological regulation of the synthesis, deposition and excretion of acetylcholine.
27. Cholinergic receptors, their types, localization. Pharmacological properties of acetylcholine.
28. M-cholinergic receptors, their subtypes, structure, functioning and localization. M-cholinomimetics, their pharmacological properties.
29. M-cholinergic receptors, their subtypes, structure, functioning and localization. M-cholinergic blockers, their pharmacological properties.
30. H-cholinergic receptors, their subtypes, structure, functioning and localization. n-Holinomimetics their pharmacological properties.
31. H-cholinergic receptors, their subtypes, structure, functioning and localization. Ganglioblockers, their pharmacological properties.
32. H-cholinergic receptors, their subtypes, structure, functioning and localization.
33. Curare-like agents, their mechanism of action and pharmacological properties.
34. Cholinesterase, its types. Anticholinesterase agents. Their pharmacological properties and mechanism of action. Cholinesterase reactivators
35. Structure and functioning of the adrenergic synapse. Pharmacological regulation of synthesis, deposition, excretion and reuptake of norepinephrine.
36. Adrenergic receptors, their types and distribution in the body. Pharmacological properties of adrenaline.
37. α -Adrenergic receptors, their structure, subtypes, functioning and distribution in the body. Pharmacological properties of α -adrenomimetics.
38. α -Adrenergic receptors, their structure, subtypes, functioning and distribution in the body. Pharmacological properties of α -blockers.
39. β -Adrenergic receptors, their structure, subtypes. functioning and distribution in the body. Pharmacological properties of β -adrenomimetics.
40. β -Adrenergic receptors, their structure, subtypes, functioning and distribution in the body. Pharmacological properties of β -blockers.
41. Sympathomimetics, their mechanism of action and pharmacological properties.
42. Sympatholytics, their mechanism of action and pharmacological properties.
43. Histamine. Its biosynthesis, metabolism, deposition and release. Histamine receptors. Antihistamines.

44. Serotonin. Its biosynthesis, metabolism, biological role and pharmacological properties. Serotonin receptors. Serotonergic agents, their properties and use in the clinic.

45. GABA. The role of GABA in the functioning of the central nervous system. GABA receptors, their participation in the implementation of the effects of drugs.

46. Glutamic acid as a neurotransmitter. Structure and functioning of NMDA receptors. Their role in the realization of the effects of medicinal substances.

47. Dopamine. The role of dopamine in the functioning of the central nervous system. Dopamine receptors, their role in the implementation of the effects of medicinal substances.

48. Eicosanoids. Their biosynthesis and role in the formation of physiological and pathological reactions of the body. Inhibitors of prostaglandin synthesis.

49. Local anesthetics. Molecular mechanisms of their action. Methods of application.

50. Endogenous opioids, their types. Opioid receptors, their participation in the formation of pharmacological reactions to morphine. Agonists and antagonists of opioid receptors

51. Ethanol. Its use in medicine. Local and resorptive effect of ethanol. Its effect on the central nervous system. Acute and chronic ethanol poisoning.

52. Anesthesia. Cellular and molecular mechanisms of action of anesthesia.

53. Hypnotic means. The mechanism of action on the central nervous system. Mechanism of barbiturate induction of metabolism of medicinal substances.

54. Anxiolytic agents. Their classification, mechanism of action and pharmacological properties.

55. Neuroleptics. Their mechanism of action and pharmacological properties.

56. Antidepressants. The mechanism of their action and pharmacological properties.

57. Psychostimulants. Their types, mechanisms of action and pharmacological properties. Features of the pharmacological properties of caffeine.

58. Non-narcotic analgesics and non-steroidal anti-inflammatory drugs. The mechanism of their action and pharmacological properties.

Criteria for grading a student on the exam

Evaluation of the test	Requirements for the formed competencies
"Excellent"	The "excellent" grade is given to the student if he has deeply and firmly mastered the program material, exhaustively, consistently, clearly and logically coherently presents it, is able to closely link the theory with

	practice, freely copes with tasks, questions and other types of application of knowledge, and does not find it difficult to answer when modifying tasks, uses the material of monographic literature in the answer, correctly justifies the decision made, has versatile skills and techniques implementation of practical tasks on the methodology of scientific research.
"Good"	The "good" grade is given to the student if he firmly knows the material, correctly and substantively presents it, avoiding significant inaccuracies in the answer to the question, correctly applies theoretical provisions when solving practical questions and problems, possesses the necessary skills and techniques for their implementation.
"satisfactory"	The grade "satisfactory" is given to the student if he has knowledge only of the basic material, but has not mastered its details, admits inaccuracies, insufficiently correct wording, violations of the logical sequence in the presentation of the program material, has difficulties in performing practical work.
"unsatisfactory"	The grade "unsatisfactory" is given to a student who does not know a significant part of the program material, makes significant mistakes, uncertainly, with great difficulties performs practical work. As a rule, the grade "unsatisfactory" is given to students who cannot continue their studies without additional classes in the relevant discipline.