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Federal State Budget Educational Institution
of Higher Education
Pacific State Medical University
of the Ministry of Health of the Russian Federation

APPROVED BY

Head of the Department of
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_____ / Eliseeva E.V./
"8th" of April 2025

SUBJECT GUIDE FOR TEACHERS AND STUDENTS FOR

Б1.О.15 Pharmacology

Specialty	**31.05.01 General Medicine** for international students (in English)
Degree	Specialist's degree
Profile	02 "Healthcare" (in the field of providing primary health care to the population in medical organizations: polyclinics, outpatient clinics, inpatient/outpatient facilities of the municipal health care system)
Mode of study	**Full-time**
Period of mastering the BEP	**6 years**
Department	of Pharmacology and Clinical Pharmacology

Vladivostok, 2025

Subject guide for teachers and students for **Б1.О.15 Pharmacology** is based on:

1) Federal State Educational Standard of Higher Education for the specialty approved by the Order No. 988 of Ministry of Science and Higher Education of the Russian Federation
dated August 12, 2020

2) Curriculum for the 31.05.01 General Medicine for international students (in English), profile 02 "Healthcare" (in the field of providing primary health care to the population in medical organizations: polyclinics, outpatient clinics, inpatient/outpatient facilities of the municipal health care system), approved by the Academic Council of FSBEI HE PSMU of the Ministry of Health of Russia, Report No. 8/24-25 dated March 31, 2025.

Subject guide for teachers and students for the discipline were developed by the writing team of the Department of Pharmacology and Clinical Pharmacology of the FSBEI HE PSMU of the Ministry of Health of Russia, under the guidance of the head of the department, Doctor of Medical Sciences, professor Eliseeva E.V.

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1. GENERAL PROVISIONS

Subject guide for **Б1.О.15 Pharmacology** is a set of recommendations and explanations that facilitate to optimal organization of mastering this discipline.

Regular analysis of lecture materials and work with end-of-the-text questions are necessary for better understanding of the material and systematization of knowledge of **Б1.О.15 Pharmacology**. Particular attention should be paid to emerging questions, confusing terms, and conflicts of points of view during the independent review of the lecture material. If necessary, a student should contact the teacher for advice. Lecture material streamlines students' thinking, while practical classes provide deeper insight into the material of the discipline.

Special attention should be paid to the content of the main provisions and conclusions, explanation of phenomena and facts, and clarification of the practical application of theoretic aspects of topic when preparing for a practical class. During this process students should aim to understand and remember the main provisions of the material under consideration, examples provided, as well as understand the illustrative material.

Collections of assessment tools are used to organize independent study of topics of the discipline.

Independent work of students is facilitated by the following:

1. availability and accessibility of the necessary educational and reference material;
2. a system of regular quality control of completed independent work;
3. availability of teacher's advice.

Subject guides for self-study are presented as literary sources and visual aids. Subject guides for independent work of students include a list of library resources of the educational institution and other materials accessible to students.

Independent work is a type of in-person extracurricular work of teachers and students of Б1.О.17 Pathophysiology, clinical pathophysiology. Control of independent work is conducted by the leading teacher. Evaluation of independent work results is taken into account when conducting interim examination of students throughout the **Б1.О.15 Pharmacology** course.

Continuous assessment during the **Б1.О.15 Pharmacology** course is implemented in order to check indicators of achieving competencies, to stimulate students' academic work, and improve methods of mastering new knowledge. Continuous assessment during the **Б1.О.15 Pharmacology** course is conducted during the semester to assess all types and sections of the academic discipline that encompass the competencies developed by the discipline: classroom questioning, conducting discussions, working with tests, and writing library-research papers. Continuous assessment of students' knowledge and results of their preparation for practical classes is conducted during every class session.

Interim assessment aims to determine the level of mastery of competency indicators. It is conducted in the exam format after the student has mastered all sections of **Б1.О.15 Pharmacology** and takes into account learning outcomes for all types of student work over the entire period of mastering the **Б1.О.15 Pharmacology** course.

Time allotted for interim assessment is indicated in the schedule.

Assignments given during practical classes, as well as assignments aimed to prepare students for continuous and interim assessment, are included in the collection of assessment tools for **Б1.О.15 Pharmacology**. If necessary, students should contact the teacher for advice. It is necessary to thoroughly think over questions that need clarification before seeking teacher's advice.

2. SUBJECT GUIDES FOR LECTURE CLASSES

Table 1. Subject Guides for **Б1.О.15 Pharmacology** Lectures

Topic No.2 General pharmacology. Pharmacokinetics. Pharmacodynamics	
Duration of the lecture (in academic hours):	2
Purpose of the lecture: 1. tell students about pharmacokinetics and pharmacodynamics of medications; 2. define key terms: pharmacokinetics, pharmacodynamics; 3. analyze methods of studying pharmacokinetics and pharmacodynamics.	
Lecture plan, order of presentation of its sections: 1. Definition of pharmacokinetics; 2. Routes of administration 3. Aspects of enteral and parenteral routes of administration; 4. Influence of routes of administration on speed of appearance therapeutic effect, its strength, duration and in some cases on its action; 5. Main patterns of absorption, deposition, metabolism and excretion of medications as a result of its interaction with organism, distribution in the body; 6. Mechanisms of absorption; 7. Factors affecting distribution of medications; 8. Biological barriers; 9. Accumulation; 10. Excretion 11. Definition of pharmacodynamics; 12. Local and resorptive action; 13. Direct and reflex action; 14. Localization and mechanism of action; 15. “Targets” for medications; 16. Reversible and irreversible action; 17. Selective action; 18. Types of interaction between a substance and a receptor; 19. Reactions caused by repeated administration; 20. Drug incompability.	
Recommended reading: 1. Pharmacology, Textbook [Электронный ресурс] Kharkevitch D.A. M. : ГЭОТАР-Медиа, 2018. - 2nd edition. - 680 pages with illustrations. - 680 с. - ISBN 978-5-9704-4307-1. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970443071.html 2. Pharmacology. Illustrated textbook (“Электронный ресурс) Alyautdin R.N. 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 3. Pharmacology: practical manual [Электронный ресурс] A. I. Vengerovsky. Kogay L. V. Pharmacology: practical manual / L. V. Kogay, O. E. Vaizova, A. I. Vengerovsky. - Томск: Издательство СибГМУ, 2019. - 230 с. - Текст: электронный // ЭБС "Букап" : [сайт]. - URL : https://www.books-up.ru/ru/book/pharmacology-practical-manual-10236726/	
Topic No.11 Antiarrhythmics. Substances increasing myocardial contractility	

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about antiarrhythmics and substances increasing myocardial contractility;
2. define key terms: antiarrhythmics;
3. analyze aspects of of pharmacokinetics and pharmacodynamics of antiarrhythmics.

Lecture plan, order of presentation of its sections:
1. Pathophysiology of cardiac dysrhythmias, reentry mechanism, biophysical mechanisms of pacemaker functioning.
2. Classification of antiarrhythmic medications by action on ion channels, choline- and adrenergic receptors
3. Medications used for treatment of tachycardia
4. Medications used for treatment of bradycardia
5. Selection of pharmacotherapy for management different types of dysrhythmias
6. Pathophysiology of acute and chronic heart failure
7. Cardiac glycosides. Indications, side effects
8. Selective beta1-adrenomimetics, dopamine, adenosine, glucagon and their role in treatment of acute and chronic heart failure

Recommended reading:
1. Pharmacology, Textbook [Электронный ресурс] Kharkevitch D.A. M. : ГЭОТАР-Медиа, 2018. - 2nd edition. - 680 pages with illustrations. - 680 с. - ISBN 978-5-9704-4307-1. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970443071.html
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3. Pharmacology: practical manual [Электронный ресурс] A. I. Vengerovsky. Kogay L. V. Pharmacology: practical manual / L. V. Kogay, O. E. Vaizova, A. I. Vengerovsky. - Томск: Издательство СибГМУ, 2019. - 230 с. - Текст: электронный // ЭБС "Букап" : [сайт]. - URL : https://www.books-up.ru/ru/book/pharmacology-practical-manual-10236726/

Topic No.16 Medications affecting appetite, motor function, and secretion in GI tract. Gallstone solubilizing agents

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about medications affecting appetite, motor function, and secretion in GI tract, gallstone solubilizing agents;
2. examine definitions and classifications of those medications;
3. analyze aspects of pharmacokinetics and pharmacodynamics of those medications.

Lecture plan, order of presentation of its sections:
1. Concept and physiology of appetite, hunger and satiety.
2. Pharmacological characteristic of medications increasing and decreasing appetite. Indications and contraindications for use.
3. Physiology of acid production in stomach. Defensive factors of gastric mucosa.
4. Pharmacological characteristic of medications increasing and decreasing acid production. Indications and contraindications for use.
5. Physiological regulation of motor function of the CI tract.

6. Pharmacological characteristic of medications increasing and decreasing GIT peristalsis. Indications and contraindications for use.
7. Pharmacological characteristic of medications for gallstone solubilizing agents. Indications and contraindications for use.

Recommended reading:
1. Pharmacology, Textbook [Электронный ресурс] Kharkevitch D.A. M. : ГЭОТАР-Медиа, 2018. - 2nd edition. - 680 pages with illustrations. - 680 с. - ISBN 978-5-9704-4307-1. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970443071.html
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3. Pharmacology: practical manual [Электронный ресурс] A. I. Vengerovsky. Kogay L. V. Pharmacology: practical manual / L. V. Kogay, O. E. Vaizova, A. I. Vengerovsky. - Томск: Издательство СибГМУ, 2019. - 230 с. - Текст: электронный // ЭБС "Букап" : [сайт]. - URL : https://www.books-up.ru/ru/book/pharmacology-practical-manual-10236726/

Topic No.20 Antimicrobial chemotherapy. Antibiotic medications. Classification and mechanism of action. General principles of antimicrobial chemotherapy

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about antimicrobial chemotherapy and principles of rational antimicrobial chemotherapy;
2. define key terms: antimicrobial agents;
3. analyze aspects of pharmacokinetics and pharmacodynamics of antimicrobial agents.

Lecture plan, order of presentation of its sections:
1. History of the creation and use of antimicrobial chemotherapeutic agents (A. Fleming, G. Flory, E. Chain, Z. Waksman, Z.V. Ermolieva).
2. Classification of antibiotics by the nature of their action on the pathogen (cidal, static), by mechanism and spectrum of action, by chemical structure and clinical use.
3. Pharmacodynamic and pharmacokinetic properties of antibacterial drugs of various groups (sulfonamides, quinolone derivatives, penicillins, cephalosporins, macrolides, aminoglycosides, tetracyclines). Clinical use.
4. Choice principles of optimal selection and combining of antibiotics (pathogen detection, identification of its sensitivity to recommended drugs – basic and reserve, rational route of administration, use of appropriate dose for achievement of antimicrobial action, correct regimen and duration taking into account of pharmacokinetics of the drug).
5. Prevention and correction of undesirable effects of antibiotics (development of microorganisms resistance, allergic reactions of immediate and delayed type, dyspeptic disorders, irritable action at the side of administration, liver, hemopoiesis and kidney toxicity, neurotoxicity, development of dysbiosis and superinfection).
6. Prospects of antibiotic-therapy (main directions in creation of new antibacterial agents, ways of optimization of use already existing antibiotics in hospitals and out-patient clinics, taking into account recent achievements of clinical microbiology, ban on drug dispense without prescription, or their unjustified usage like at viral infections).

Recommended reading:
1. Pharmacology, Textbook [Электронный ресурс] Kharkevitch D.A. M. : ГЭОТАР-Медиа, 2018. - 2nd edition. - 680 pages with illustrations. - 680 с. - ISBN 978-5-9704-4307-1. - Текст :

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3. SUBJECT GUIDES FOR PRACTICAL CLASSES

Table 2. Subject Guides for Practical **Б1.О.15 Pharmacology** Classes

Topic No.2 General pharmacology. Principles of finding new medications. Evidence-based medicine: principles, levels of evidence. Pharmacokinetics. Pharmacodynamics	
Duration of the practical class (in academic hours):	4
Purpose of the practical class: 1. consolidate acquired knowledge on the topic; 2. during the discussion, outline pharmacokinetic processes (absorption, distribution, biotransformation, excretion), specifics of these processes in normal and pathological conditions, as well as in the organism of a child, adult, pregnant, or elderly person; 3. thoroughly go over routes of administration, their features, advantages and disadvantages; 4. during the discussion, outline pharmacodynamic processes, the main mechanisms of action, types of transport of substances through biological membranes; 5. examine types of interaction between medications; 6. develop the ability to identify the main methods to treat acute and chronic drug poisoning.	
Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, and subject guides for the discipline.	
Independent work of the student: Working with study materials. Preparing for continuous assessment. Writing a report on individual work performed.	
Methods of evaluation of acquired knowledge and skills: classroom questioning, tests.	
Recommended reading: 1. Pharmacology, Textbook [Электронный ресурс] Kharkevitch D.A. M. : ГЭОТАР-Медиа, 2018. - 2nd edition. - 680 pages with illustrations. - 680 с. - ISBN 978-5-9704-4307-1. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970443071.html 2. Pharmacology. Illustrated textbook (“Электронный ресурс) Alyautdin R.N. 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 3. Pharmacology: practical manual [Электронный ресурс] A. I. Vengerovsky. Kogay L. V. Pharmacology: practical manual / L. V. Kogay, O. E. Vaizova, A. I. Vengerovsky. - Томск: Издательство СибГМУ, 2019. - 230 с. - Текст: электронный // ЭБС "Букап" : [сайт]. - URL : https://www.books-up.ru/ru/book/pharmacology-practical-manual-10236726/	

Topic No. 10 Cardiotonic agents. Principles of treating heart failure. Antianginal agents	
Duration of the practical class (in academic hours):	4
Purpose of the practical class: 1. consolidate acquired knowledge on the topic; 2. during the discussion, outline pharmacokinetics and pharmacodynamics of different groups of cardiotonic and antianginal medications; 3. thoroughly go over definitions and concepts of indications and contraindications for use of these medications; 4. study patterns of interactions between different groups of these medications; 5. develop the ability to prescribe these medications; 6. identify pharmacotherapeutic goals for treatment of acute and chronic heart failure.	
Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, and subject guides for the discipline.	
Independent work of the student: Working with study materials. Preparing for continuous assessment. Writing a report on individual work performed.	
Methods of evaluation of acquired knowledge and skills: classroom questioning, tests, solving practice problems, demonstration of prescription skills	
Recommended reading: 1. Pharmacology, Textbook [Электронный ресурс] Kharkevitch D.A. M. : ГЭОТАР-Медиа, 2018. - 2nd edition. - 680 pages with illustrations. - 680 с. - ISBN 978-5-9704-4307-1. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970443071.html 2. Pharmacology. Illustrated textbook (“Электронный ресурс) Alyautdin R.N. 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 3. Pharmacology: practical manual [Электронный ресурс] A. I. Vengerovsky. Kogay L. V. Pharmacology: practical manual / L. V. Kogay, O. E. Vaizova, A. I. Vengerovsky. - Томск: Издательство СибГМУ, 2019. - 230 с. - Текст: электронный // ЭБС "Букап" : [сайт]. - URL : https://www.books-up.ru/ru/book/pharmacology-practical-manual-10236726/	
Topic No.21 General principles of rational antimicrobial chemotherapy. Antibiotic medications	
Duration of the practical class (in academic hours):	4
Purpose of the practical class: 1. consolidate acquired knowledge on the topic; 2. during the discussion, outline pharmacokinetics and pharmacodynamics of antibacterial medications of different groups; 3. thoroughly go over indications and contraindications for use of antibacterial medications of different groups; 4. study aspects of use of antibacterial medications depending on localization of infectious process and identified/supposed pathogen; 5. develop the ability to prescribe antibacterial medications; 6. examine side effects of antibacterial medications (especially resistance, dysbiosis, etc.) and	

main principles of their prevention.
Practical classes requirements: classrooms equipped with multimedia equipment, blackboards, and subject guides for the discipline.
Independent work of the student: Working with study materials. Preparing for continuous assessment. Writing a report on individual work performed.
Methods of evaluation of acquired knowledge and skills: classroom questioning, tests, solving practice problems, demonstration of prescription skills
Recommended reading: 1. Pharmacology, Textbook [Электронный ресурс] Kharkevitch D.A. M. : ГЭОТАР-Медиа, 2018. - 2nd edition. - 680 pages with illustrations. - 680 с. - ISBN 978-5-9704-4307-1. - Текст : электронный // ЭБС "Консультант студента" : [сайт]. - URL : https://www.studentlibrary.ru/book/ISBN9785970443071.html 2. Pharmacology. Illustrated textbook (“Электронный ресурс) Alyautdin R.N. 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 3. Pharmacology: practical manual [Электронный ресурс] A. I. Vengerovsky. Kogay L. V. Pharmacology: practical manual / L. V. Kogay, O. E. Vaizova, A. I. Vengerovsky. - Томск: Издательство СибГМУ, 2019. - 230 с. - Текст: электронный // ЭБС "Букап" : [сайт]. - URL : https://www.books-up.ru/ru/book/pharmacology-practical-manual-10236726/

4. GUIDELINES FOR CONTINUOUS AND INTERIM ASSESSMENT

Table 3. Guidelines for Conducting Continuous and Interim Assessment during **Б1.О.15 Pharmacology** Course

Type of assessment	Assessment format
Continuous assessment	- conducting and evaluating oral or written quizzes during lectures and practical classes; - assessment and evaluation of completion and results of assignments given during practical classes; - assess and evaluate completion and results of individual assignments and exam tasks given during practical classes; - assessment and evaluation of prescriptions workbook quality.
Interim assessment	is conducted in exam format (answering interview questions and working with case studies); it allows to assess the development of students' competencies correlating with types of professional activity.

5 ASPECTS OF THE IMPLEMENTATION OF THE COURSE FOR STUDENTS WITH DISABILITIES AND SPECIAL NEEDS

5.1. Availability of accessible environment

For students with disabilities and special needs, if a written application is submitted, lectures and practical classes are carried out taking into account health limitations, individual capabilities and medical status (hereinafter referred to as individual characteristics) of the student. Compliance

with the following general requirements is ensured: teaching aids for collective and individual use are provided, required technical assistance is provided by an assistant; buildings and premises where lectures and practical classes are taking place meet accessibility requirements, other arrangements lack of which makes it impossible or difficult to master the discipline are made.

5.2. Compliance with general requirements

When lectures and practical classes are carried out at the written application of the student, the following general requirements are met: lectures and practical classes for students with disabilities and special needs take place at the same location as for students who do not have disabilities, if this does not cause difficulties for students; an assistant (assistants), who provide(s) students with the necessary technical assistance taking into account individual characteristics of the student, is (are) provided; necessary teaching aids are provided, taking into account individual characteristics of the student.

5.3. Availability of the internal policies and procedures of FSBEI HE PSMU of the Ministry of Health of Russia to students with disabilities in a form accessible to them.

All internal policies and procedures of FSBEI HE PSMU of the Ministry of Health of Russia concerning the discipline (module) are made available to students with disabilities in a form accessible to them.

5.4. Increase in the duration of interim assessment of students with disabilities and special needs in relation to the established duration

Format of the interim assessment of academic performance within the scope of the discipline for students with disabilities and special needs is selected taking into account individual characteristics (orally, by writing on paper, by typing on a computer, as a test, etc.). The duration of the interim assessment in relation to the established duration is increased at the written application of the student with disabilities. Time limit for the student's preparation for the test is increased by at least 0.5 hours

6. STAFFING REQUIREMENTS OF THE DISCIPLINE

Academic teaching personnel that ensure the implementation of the discipline education process meet the requirements of the Federal State Educational Standard of Higher Education for the 31.05.01 General Medicine specialty; list of the aforementioned personnel is available on the website of the educational organization.