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

SUBJECT GUIDE FOR TEACHERS AND STUDENTS FOR

Б1.О.21 Clinical pharmacology

(Name of discipline)

Specialty	**31.05.01 General Medicine for international students (in English)** (code, name)
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** (nominal length of study)
Department	of Pharmacology and Clinical Pharmacology

Vladivostok, 2025

Subject guide for teachers and students for **Б1.О.21 Clinical 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 **Б1.О.21 Clinical pharmacology** 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.21 Clinical 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.21 Clinical 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 **Б1.О.21 Clinical pharmacology**.

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. 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.21 Clinical pharmacology**. 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.21 Clinical pharmacology** course.

Continuous assessment during **Б1.О.21 Clinical 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 **Б1.О.21 Clinical 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, preparing reports. 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.21 Clinical pharmacology** and takes into account learning outcomes for all types of student work over the entire period of mastering **Б1.О.21 Clinical 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.21 Clinical 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.21 Clinical pharmacology** Lectures

Topic No.3 Significance of pharmacokinetics and pharmacodynamics of medications in prescription. Pharmacogenetics	
Duration of the lecture (in academic hours):	2
Purpose of the lecture: 1. tell students about pharmacokinetics and pharmacodynamics of medications; 2. define pharmacokinetics and pharmacodynamics; 3. examine methods of studying pharmacokinetics and pharmacodynamics.	
Lecture plan, order of presentation of its sections: - Definition of pharmacokinetics - Routes of administration - Aspects of enteral and parenteral routes of administration - Influence of routes of administration on speed of reaching therapeutic effect, its pronouncement, duration and (in some cases) its action - Main patterns of absorption, deposition, metabolism and excretion of medications as a result of its interaction with organism, distribution of substances in the body - Mechanisms of medication absorption - Factors affecting on distribution of medications - Biological barriers - Substance accumulation - Substance excretion - Definition of pharmacodynamics - Local and resorptive action of medications - Direct and reflex action of medications - Localization and mechanism of action - «Targets» for medications - Reversible and irreversible action - Selective action - Types of interaction between substance and receptor - Reactions due to repeated administration - Medications incompability - Pharmacogenetics	
Recommended literature 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.7 Clinical pharmacology of agents affecting the organs of digestion	
Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about medications regulating appetite, peristalsis and secretory function of GIT, bile production and bile release; about agents of liver protection;
2. define and provide classification of these medications;
3. examine aspects of pharmacokinetics and pharmacodynamics of these medications.

Lecture plan, order of presentation of its sections:
- Concept and physiology of appetite, hunger and satiety
- Pharmacological characteristic of medications increasing and decreasing appetite Indications and contraindications for use
- Physiology of acid production in stomach. Defensive factors of gastric mucosa
- Pharmacological characteristic of medications increasing and decreasing acid production Indications and contraindications for use
- Physiological regulation of GIT peristalsis
- Pharmacological characteristic of medications increasing and decreasing GIT peristalsis. Indications and contraindications for use
- Pharmacological characteristic of medications for liver protection. Indications and contraindications for use

Recommended literature
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.8 Clinical pharmacology of antimicrobial agents. Basic principles of rational antibacterial therapy

Duration of the lecture (in academic hours):	2

Purpose of the lecture:
1. tell students about antibacterial chemotherapy and principles of rational antibacterial therapy;
2. define and provide classification of antimicrobial agents
3. examine aspects of pharmacokinetics and pharmacodynamics of these medications.

Lecture plan, order of presentation of its sections:
- History of the creation and use of antimicrobial chemotherapeutic agents (A. Fleming, G. Flory, E. Chain, Z. Waksman, Z.V. Ermolieva)
- 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
- Pharmacodynamic and pharmacokinetic properties of antibacterial agents of various groups (sulfonamides, quinolone derivatives, penicillins, cephalosporins, macrolides, aminoglycosides, tetracyclines). Clinical use
- Choice principles of optimal selection and combining of antibiotics (pathogen detection, identification of its sensitivity to recommended medications – 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)

- Prevention and correction of undesirable effects of antibiotics (development of microorganisms resistance, allergic reactions of immediate and delayed type, dyspeptic disorders, irritation at the site of administration, liver, hemopoiesis and kidney toxicity, neurotoxicity, development of dysbiosis and superinfection)
- Prospects of antibiotic-therapy (main directions in creation of new antibacterial agents, ways of optimization of use already existing antibiotics in hospitals and outpatient clinics, taking into account recent achievements of clinical microbiology, ban on drug dispense without prescription, or their unjustified usage – such as for treating viral infections)

Recommended literature

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. SUBJECT GUIDES FOR PRACTICAL CLASSES

Table 2. Subject Guides for Practical **Б1.О.21 Clinical pharmacology** Classes

Topic No.1 Subject of clinical pharmacology. Terminology and concepts. Sections of clinical pharmacology. Clinical pharmacokinetics and pharmacodynamics	
Duration of the practical class (in academic hours):	2
Purpose of the practical class: 1. consolidate knowledge acquired during lectures and independent work; 2. during the discussion, outline pharmacokinetic processes (absorption, distribution, biotransformation, excretion), aspects of these processes in normal and pathological conditions, as well as in the organism of a child, adult, pregnant woman, or an elderly person; 3. thoroughly go over the routes of administration, their features, advantages and disadvantages; pharmacodynamic processes, the main mechanisms of action of medications, types of transport of substances through biological membranes; 4. study the types of interactions between medications; 5. learn 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; and preparation of a report on the results of the independent work.	
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 :	

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Topic No.17-18 Clinical pharmacology of agents used to treat gastric and duodenal ulcer. Clinical pharmacology of medications affecting gastro-intestinal motility

Duration of the practical class (in academic hours):	4

Purpose of the practical class:
1. consolidate knowledge acquired during lectures and independent work;
2. during the discussion, outline pharmacokinetics and pharmacodynamics of medications used for treatment of gastro-intestinal diseases, indications and contraindications for use of different groups of these medications; features of these medications that depend on patient's comorbidities;
3. thoroughly go over how to prescribe medications used for treatment of gastro-intestinal diseases;
4. analyze side effects of medications used for treatment of gastro-intestinal diseases (such as achylia, diarrhea, constipation 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; and preparation of a report on the results of the independent work.

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
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Topic No.21 General principles of rational antimicrobial chemotherapy

Duration of the practical class (in academic hours):	2

Purpose of the practical class:
1. consolidate knowledge acquired during lectures and independent work;
2. during the discussion, outline pharmacokinetics and pharmacodynamics of antibacterial agents

of different groups, indications and contraindications for use of antibacterial agents of different groups; aspects of using antibacterial agents depending on localization of infectious process and identified/supposed pathogen; 3. thoroughly go over how to prescribe antibacterial agents; 4. analyze side effects of antibacterial agents (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; and preparation of a report on the results of the independent work.
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/

4. GUIDELINES FOR CONTINUOUS AND INTERIM ASSESSMENT

Table 3. Guidelines for Conducting Continuous and Interim Assessment during **Б1.О.21 Clinical pharmacology** Course

Type of assessment	Assessment format
Continuous assessment	- conducting and evaluating oral quizzes during 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 certification	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 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 for international students (in English) specialty; list of the aforementioned personnel is available on the website of the educational organization.