FACULTY OF MEDICINE

STUDY PROGRAM 0912.1 MEDICINE 2

PHARMACOLOGY AND CLINICAL PHARMACOLOGY DEPARTMENT

APPROVED
at the meeting of the Board of quality assurance and curriculum evaluation of the Faculty of Medicine 2
Minutes No. 1 dated on 16.09.21
Chairman _PHD, Associate Professor _____
Suman Serghei_____

APPROVED
at the meeting of the Council of Faculty of Medicine 2
Minutes No. 1 dated on 21.09.21
Dean of the Medicine nr. 2 Faculty
Associate Professor
Bețiu Mircea_____

APPROVED
At the meeting of the Committee of the department of pharmacology and clinical pharmacology
Minutes No. 3 of 15.09.2021
Head of department PHD, Associate Professor
Bacinschi Nicolae _____

CURRICULUM

DISCIPLINE **CLINICAL PHARMACOLOGY**

Integrated studies

Type of the course: **Compulsory discipline**

Curriculum developed by the team of authors:

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Guțu Ina, university assistant
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Chisinau, 2021

I. PRIMARIES

- **General presentation of the discipline: the place and role of the discipline in the formation of the specific competences of the vocational / specialty training program**
  Clinical pharmacology is a clinical and applicative discipline that at the university level will enable the future doctor to acquire the pharmacokinetic, pharmacogenetic and pharmacodynamic principles of drug groups characterization in order to apply knowledge to the assessment of efficacy and harmlessness, rational selection of preparations. The study of the discipline will allow the student to argue the appropriate selection of the drugs for the particular patient and to appreciate the correctness of the indications made in accordance with clinical diagnostic and treatment standards and protocols.
  Profound knowledge in the field of medical and biological disciplines (anatomy, physiology, histology, biochemistry, physiopathology, morphopathology, microbiology, fundamental pharmacology) and clinical (internal medicine, surgery, infectious diseases, pediatrics, endocrinology, neurology, obstetrics and gynecology etc.) is required to master the clinical pharmacology.
- **The mission (purpose) of the curriculum in vocational training**
  The basic aim of clinical pharmacology is to develop students' ability to apply the knowledge about pharmacokinetics, pharmacodynamics, compatibility and adverse drug reactions for a rational and differential treatment of the patients.
- **Language/languages of teaching the discipline:** English;
- **Beneficiaries:** students of the 5th year, Faculty of Medicine

II. DISCIPLINE ADMINISTRATION

Discipline code		**S.09.O.084**	
Discipline denomination		**Clinical pharmacology**	
Responsible (s) of the discipline		**PhD of Medicine, professor Bacinschi Nicolae**	
Year	**5th**	Semesters	**10th**
Total number of hours, including:			**60**
Course	**16**	Practical/laboratory works	**16**
Seminars	**16**	Individual work	**12**
Evaluation form	**Examen test**	Number of credits	**2**

III. TRAINING OBJECTIVES IN THE DISCIPLINE

At the end of the course, the student will be able to:

✓ ***At the level of knowledge and understanding:***

- To define the structure of the prescription and the principles of drugs in different forms;
- To identify the concept of raw drug material, substance, form and nomenclature;
- To identify drug interactions and incompatibilities;
- To list the basic principles of general drug classification;
- To describe basic principles of general and specia pharmacokinetics, pharmacodynamics, chronopharmacology and pharmacogenetics;
- To memorize the groups of drugs, the obligatory preparations with their prescription in different medicinal forms;
- To list the classification, mechanism of action, effects, indications, contraindications and side effects of groups of drugs and specific drugs;
- To name the groups of drugs: definition, classification;
- To recognize the affiliation of the drugs to certain groups of chemical compounds; pharmacodynamics of substances (mechanism and site of action, effects, indications,

contraindications, side effects and toxicity), pharmacokinetics of substances (route of administration, elimination), comparative characteristics of drugs;

- To find possibilities of using drugs for medical purposes based on the knowledges of their properties.

✓ ***at the application level student will be able:***

- To select and prescribe drugs in different diseases and pathological states;
- To demonstrate pharmacological effects in experimental studies;
- To implement the principles of cause and effect (dose-effect), benefit – injury;
- To solve tests and problematic cases;
- To be able to solve emergencies;
- To select the most effective ways of drug administration based on their pharmacokinetic and pharmacodynamic properties, preventing interaction, incompatability and complications of the medical treatment;
- To apply rules of prescription and the prescription of drugs in all their medical forms;
- To prescribe the medication of choice in various diseases and first of all in states of emergency, and depending on the pathogen, etc.;
- Apply the dosing principles and determine the routes of administration of age-dependent drugs;
- To estimate pharmacogenetically which drugs pose a risk to the patient in various enzymopathies;
- To estimate the clinical picture and the basic symptoms in drug intoxications, first aid measures, antidotes and general principles of treatment, methods of neutralization of the toxic absorbed in the body and correction of disordered functions;
- To sketch the biological standardization of the preparation;
- To use the concomitant administration of several drugs without risk of incompatibility;
- To administer the correct medicine depending on the biological rhythms;
- To apply the theoretical knowledge to solve the situation problems, of the case - clinical problems;
- Expressly modify a drug with another drug substance in the same group to minimize side effects and perform effective treatment;
- To apply the method for determining the therapeutic index of the drug substance in experimental and clinical conditions, renal and hepatic clearance;
- To demonstrate the dose-effect relationship and the bioavailability of the drug preparation;
- Operate optimally in the provision of emergency assistance in situations of overdose or inadequate drug reactions.

✓ ***at the integration level:***

- To assess the importance and role of pharmacology in the context of general medicine and its integration into related disciplines;
- To integrate medical and biological knowledge in learning pharmacology;
- To distinguish the correlations between physiological and pathological processes and pharmacological properties of drugs;
- To form basic principles of ethics and deontology in medical treatment (pharmacotherapy);
- To propose research programs to develop new drugs and study further known medical substances;
- To integrate the acquired knowledge of pharmacology in clinical disciplines;

- To be able to acquire pharmacological news:

IV. PREVIOUS CONDITIONS AND REQUIREMENTS

Clinical pharmacology is a clinical and applicative discipline that at the university level will enable the future doctor to acquire the pharmacokinetic, pharmacogenetic and pharmacodynamic principles of drug groups characterization in order to apply knowledge to the assessment of efficacy and harmlessness, rational selection of preparations. The study of the discipline will allow the student to argue the appropriate selection of the drugs for the particular patient and to appreciate the correctness of the indications made in accordance with clinical diagnostic and treatment standards and protocols.

Profound knowledge in the field of medical and biological disciplines (anatomy, physiology, histology, biochemistry, physiopathology, morphopathology, microbiology, fundamental pharmacology) and clinical (internal medicine, surgery, infectious diseases, pediatrics, endocrinology, neurology, obstetrics and gynecology etc.) is required to master the clinical pharmacology.

In addition, it is necessary for the student to master the information technologies (use of the Internet, document processing, electronic tables and presentations, use of graphic programs) at an adequate level, the communication skills and teamwork, as well as being tolerant, compassionate and autonomous.

V. THEMES AND ORIENTATIVE DISTRIBUTION OF HOURS

Courses (lectures), practical works/ laboratory works/seminars and individual work

No.	THEME	Number of hours		
		L	P S /W	I/W
1.	Clinical pharmacology and current drug reforms. The concept of rational use of drugs. Original and generic drugs, biosimilar and orphan. Bioequivalence of drugs. Notion of compliance and ways to increase it. Self-treatment (self-medication).	2		
2.	Pharmacokinetics, pharmacogenetics and clinical pharmacodynamics. Therapeutic drug monitoring: indications and interpretations. Principles of rational selection of medicines and their practical application.	2		2
3.	Clinical pharmacology of preparations used in diseases of the respiratory system. Clinical pharmacology of antiallergic preparations and immunomodulators. Selection of personal medicines..		4	
4.	Clinical pharmacology of drugs influencing the secretion and motility of the digestive tract. Selection of personal drugs..		4	
5.	Clinical pharmacology of preparations used in diseases of the liver, bile ducts and pancreas.	2		2
6.	Clinical pharmacology of antiarrhythmic, antianginal preparations and used in heart failure. Selection of personal medicines.		4	
7.	Clinical pharmacology of antihypertensive and antihypertensive drugs. Selection of personal medicines.		4	
8.	Clinical pharmacology of hemostatic and antithrombotic preparations. Selection of personal medicines.		4	
9.	Clinical pharmacology of antibiotics and chemotherapeutics various chemical structure. Selection of personal medicines.		4	
10.	Clinical pharmacology of new antibiotics, antiviral, antituberculosis and	2		2

No.	THEME	Number of hours		
		L	P S /W	I/W
	antifungal preparations.			
11.	Clinical pharmacology of analgesic and anti-inflammatory drugs.	2		2
12.	Clinical pharmacology of psychotropic drugs (antipsychotics, anxiolytics, sedatives, antidepressants, nootropics and CNS stimulants). Selection of personal medicines.		4	
13.	Clinical pharmacology of hypnotic preparations, symptomatic anticonvulsants, antiepileptics, antiparkinsonian and used in Alzheimer's disease.	2		2
14.	Clinical pharmacology of thyroid gland preparations, antidiabetics and. glucocorticoids. Selection of personal medicines.		4	
15.	Clinical pharmacology of venotropic, angioprotective, antimigraine, cerebral and peripheral vasodilators	1		1
16.	Clinical pharmacology of lipid-lowering preparations and used in obesity, osteoporosis.	1		1
17.	Complications of pharmacotherapy. Adverse drug reactions. Drug interactions.	2		
Total		**16**	**32**	**12**

VI. PRACTICAL TOOLS PURCHASED AT THE END OF THE COURSE

Mandatory essential practical tools are:

1. To conduct a review of the literature on clinical pharmacology issues on a particular tern.
2. To analyze the results of pharmacodynamic and pharmacokinetic researches of medicinal preparations.
3. To select the methods of clinical, paraclinical and laboratory investigations to assess the therapeutic effects of the preparations used by patients.
4. To make an appropriate choice to determine the most effective and harmless pharmacological preparations in the given patient.
5. To select the optimal dosing regimen and routes of administration, based on the pharmacokinetic and pharmacodynamic features, as well as the functional (age, sex, etc.) and pathological condition of the specific patient.
6. To recommend the most effective and harmless combinations of combined drugs and / or preparations in the specific clinical situation, based on the basic principles of rational pharmacotherapy (efficacy, harmlessness and cost of treatment).
7. To predict and detect possible adverse reactions in the initial stages; to perform their prophylaxis and treatment (correction).
8. To present the necessary information to the patient in order to co-opt him in the curative process and to increase his responsibility towards the treatment performed and his own health.
9. To implement in medical practice contemporary data on rational pharmacotherapy, pharmacological preparations, including new ones.

10. To use the knowledge obtained regarding pharmacokinetics, pharmacodynamics, drug interaction and their adverse effects in patients to perform a differentiated and rational pharmacotherapy.
11. To make an appropriate selection and prescribe a rational drug treatment that includes the most effective, harmless, convenient and affordable drugs.
12. To select the most necessary set of investigative methods for assessing the pharmacodynamic effects of drugs and interpreting the data obtained.
13. To know the principles of selection of P-drugs and P-treatment.
14. To apply the pharmacokinetic and pharmacodynamic principles to the rational use of preparations by means of P-drugs and P-treatment
15. To know the requirements for conducting investigations and clinical trials of imported and indigenous medicines.
16. To know the manner and principles of elaboration and use of the pharmacotherapeutic form and of the medico-economic standards for the treatment of the most widespread diseases and pathological conditions, as well as other documents, which regulate the prescription and use of medicinal preparations.
17. To know and implement in practice the system of surveillance and pharmacovigilance of drugs.

VII. REFERENCE OBJECTIVES AND CONTENTS UNITS

Objectives	Contents units
Theme 1.	
• • to know the current reforms in the field of medicine, • • to know the concept of rational use of drugs, the form system and the indications for performing therapeutic drug monitoring. • • To differentiate the original and generic preparations; • • To appreciate the particularities of biosimilar and orphan preparations; • • To know the notions of pharmaceutical, pharmacokinetic and therapeutic bioequivalence; • • Know the division of self-treatment on health.	Clinical pharmacology and current drug reforms. The concept of rational use of drugs. Original and generic drugs, biosimilar and orphan. Bioequivalence of drugs. Notion of compliance and ways to increase it. Self-treatment (self-medication).
Theme 2.	
• To define the notions of clinical pharmacokinetics, pharmacogenetics and pharmacodynamics, therapeutic drug monitoring, pharmacotherapy form. •To know the reforms in the field of drug at present, the concept of rational use of drugs, the system of form and the indications for performing therapeutic drug monitoring. •To apply the principles of rational drug selection, the P-drug selection method. •To integrate the pharmacokinetic, pharmacogenic and pharmacodynamic properties of drugs for the purpose of rational drug selection.	Clinical pharmacokinetics, pharmacogenetics and pharmacodynamics. Therapeutic drug monitoring: indications and interpretations. Principles of rational drug selection and their practical application. Clinical pharmacology and reforms in the field of drug at present. The concept of rational use of drugs.
Theme 3.	
• To define the notions of bronchodilatory, analgezic, immunostimulating, immunosuppressive, antiallergic drugs •To know the pharmacodynamic and pharmacokinetic particularities of immunostimulatory, immunodepressive, antiallergic drug groups and those used in diseases of the respiratory system.	Clinical pharmacology of drugs used in respiratory system diseases. Clinical pharmacology of anti-allergic drugs and

Objectives	Contents units
•To display the skills of drawing up the personal form (P-drugs). •To apply prognosis of possible side effects, to establish their dependence on the dosage regimen. •To integrate the principles of dosage regimen depending on group membership and corresponding disease.	immunomodulators. Selection of personal drugs.
Theme 4.	
• To define the notions of anti-ulcer, prokinetic, antidiarrheal, antiemetic and spasmolitic drugs. • To know the pharmacodynamic and pharmacokinetic particularities of drug groups with influence on motility and secretory activity used in TGI system diseases. •To display the skills of drawing up the personal form (P-drugs). •To apply prognosis of possible side effects, to establish their dependence on the dosage regimen. •To integrate the principles of dosage regimen depending on group membership and corresponding disease.	Clinical pharmacology of drugs used in secretory disorders and disorders of digestive tract motility. Selection of personal drugs.
Theme 5.	
• To define the notions of pancreatic enzymes,. hepatoprotectors, , choleretic, cholecystokinetic, colelitolytic drugs. • To know the pharmacodynamic and pharmacokinetic particularities of drug groups with influence on motility and secretory activity used in TGI system diseases. •To display the skills of drawing up the personal form (P-drugs). •To apply prognosis of possible side effects, to establish their dependence on the dosage regimen. •To integrate the principles of dosage regimen depending on group membership and corresponding disease.	Clinical pharmacology of preparations used in diseases of the liver, bile ducts and pancreas. Selection of personal drugs.
Theme 6.	
• To define the notions of antiarrhythmic, antianginal and drugs uysed in heart falure. • To know the pharmacodynamic and pharmacokinetic particularities of the antiarrhythmic, antianginal, and inotropic drug groups. • To display the skills of drawing up the personal form (P-drugs). • To apply prognosis of possible side effects, to establish their dependence on the dosage regimen. • To integrate the principles of dosage regimen depending on group membership and corresponding disease.	Clinical pharmacology of antiarrhythmic and hypolipidemic drugs. Clinical pharmacology of anti-anginal and inotropic drugs. Selection of personal drugs.
Theme 7.	
• To select the minimum investigative complex to assess the pharmacodynamic effect of antihypotensive and antihypertensive drugs. •To analyze and to evaluate the results of pharmacodynamic studies of antihypertensives and antihypotensives; •To predict the possible complications and side effects of drugs in this group •To predict the dependence of side effects of drugs in this group on the dosage regimen and on the functional state of the heart and other organs and systems •To apply contemporary methods of pharmacological correction of side effects caused by antihypertensive and antihypotensive drugs. •to drawn up the personal form (P-drugs) in the conditions associated with hypo- or hypertension.	Clinical pharmacology of antihypertensive and antihypotensive drugs. Selection of personal drugs.
Theme 8.	

Objectives	Contents units
•To know and to select the minimal complex of investigations in order to assess the pharmacodynamic effect of hemostatic and antithrombotic remedies. •To know the principles of interaction of hemostatic and antithrombotic remedies with other groups of drugs and to predict the possible side effects. •To show the analysis and assessment of the results of the study of the pharmacodynamics of hemostatic and antithrombotic. •To predict the dependence of the side effects of the studied drugs on the dosage regimen and the functional state of the organs and systems of the body. •To apply contemporary methods of pharmacological correction of side effects caused by hemostatic and antithrombotic •To drawn up the personal form (P-drugs) of this group of drugs	Clinical pharmacology of haemostatic and antithrombotic drugs. Selection of personal drugs.
Theme 9.	
• to know the mechanisms of action and the particularities of the action of antibiotics, and chemotherapeutics various chemical structure. for their rational selection •to display analytical skills and appreciation of the results of microbiological, laboratory and instrumental methods for determining the efficacy of the drugs and for correcting the specific treatment •to predict the possible complications and side effects of the drugs •to predict the dependence of the side effects of the drugs on the dosage regimen and the functional state of the organs and systems of the body •To display the skills of drawing up the personal drugs form (P-drugs).	Clinical pharmacology of antibiotics and chemotherapeutics various chemical structure. Selection of personal medicines.
Theme 10.	
•to know the mechanisms of action and the particularities of the action of antiviral, antituberculosis and antifungal drugs for their rational selection •to display analytical skills and appreciation of the results of microbiological, laboratory and instrumental methods for determining the efficacy of the drugs and for correcting the specific treatment •to predict the possible complications and side effects of the antiviral, antituberculosis and antifungal drugs •to predict the dependence of the side effects of the drugs on the dosage regimen and the functional state of the organs and systems of the body •To display the skills of drawing up the personal drugs form (P-drugs).	Clinical pharmacology of new antibiotics, antiviral, antituberculosis and antifungal preparations.
Theme 11	
•to know the minimum complex of investigative methods for assessing the pharmacodynamic effect of analgezics, anti-inflammatory, antirheumatic drugs and used in osteoporosis •to show the analysis and evaluation of pharmacodynamic study of analgezics, anti-inflammatory, antirheumatic drugs and used in osteoporosis •to predict possible complications and side effects of the drugs of studied groups •to predict the dependence of possible appearance of side effects on the dosage regimen and the functional status of the organs and systems of the body •to apply contemporary methods of pharmacological and non-pharmacological correction of side effects caused by anti-inflammatory, antirheumatic drugs and used in osteoporosis to display the necessary skills to drawn up the personal drugs form (P-drugs)	Clinical pharmacology of analgesic and anti-inflammatory drugs.
Theme 12	

Objectives	Contents units
•to know the minimum complex of investigative methods for assessing the pharmacodynamic effect psychotropic drugs •to predict possible complications and side effects of the drugs from psihotropic drugs •to analyze and to evaluate the results of pharmacodynamic study of drugs, obtained by laboratory and instrumental methods •to predict the dependence of possible appearance of side effects on the dosage regimen and the functional status of the organs and systems of the body •to apply contemporary methods of prophylaxis and treatment of drugs side effects •to predict the interaction of analgesic preparations with CNS influence, including psychotropic, with each other and with other drugs	Clinical pharmacology of psychotropic drugs (antipsychotics, anxiolytics, sedatives, antidepressants, nootropics and CNS stimulants). Selection of personal medicines.
Theme 13	
•to know the minimum complex of investigative methods for assessing the pharmacodynamic effect of hypnotic preparations, symptomatic anticonvulsants, antiepileptics, antiparkinsonian and used in Alzheimer's disease. •to predict possible complications and side effects of the drugs from studied groups •to analyze and to evaluate the results of pharmacodynamic study of drugs, obtained by laboratory and instrumental methods •to predict the dependence of possible appearance of side effects on the dosage regimen and the functional status of the organs and systems of the body •to apply contemporary methods of prophylaxis and treatment of drugs side effects •to predict the interaction of analgesic preparations with CNS influence, including psychotropic, with each other and with other drugs	Clinical pharmacology of hypnotic preparations, symptomatic anticonvulsants, antiepileptics, antiparkinsonian and used in Alzheimer's disease.
Theme 14	
• To select a minimum set of investigative methods in order to assess the pharmacodynamic effect of hormonal preparations of the thyroid gland, antidiabetics and glucocorticoids; • to appreciate the results of the study of the pharmacodynamics of the hormonal preparations of the thyroid gland, antidiabetics and glucocorticoids, obtained by laboratory and instrumental methods • to predict the possible complications and side effects of the drugs in this group demonstrate; • to predict the dependence of adverse reactions on the dosing regimen of these preparations and the functional state of the organs and systems of the organism; • to apply contemporary methods of pharmacological and non-pharmacological correction of adverse reactions caused by hormonal and antihormonal preparations; • to select a minimum complex of investigation methods, in order to assess the modification of the pharmacodynamic effect by the pharmacokinetic and pharmacodynamic drug interactions; • to analyze and appreciate the results of the pharmacodynamics of the different preparations taking into account the possible interactions between them; • to predict the dependence of adverse reactions on the dosing regimen and the functional state of the body's organs and systems; • to apply contemporary methods of pharmacological and non-pharmacological correction of adverse reactions caused by drugs; • to know and apply the principles of treatment and prophylaxis of	Clinical pharmacology of thyroid gland preparations, antidiabetics and. glucocorticoids. Selection of personal medicines.

Objectives	Contents units
intoxications with drugs and toxic substances.	
Theme 15	
•To know and to select the minimal complex of investigations in order to assess the pharmacodynamic effect of venotropic, angioprotective, antimigraine, cerebral, peripheral and antimigraine vasodilators, •To know the principles of interaction with other groups of of venotropic, angioprotective, antimigraine, cerebral, peripheral and antimigraine vasodilators drugs and to predict the possible side effects. •To show the analysis and assessment of the results of the study of the pharmacodynamics of the cerebral, peripheral, and antimigraine vasodilators. •To predict the dependence of the side effects of the studied drugs on the dosage regimen and the functional state of the organs and systems of the body. •To apply contemporary methods of pharmacological correction of side effects caused by of venotropic, angioprotective, antimigraine, cerebral, peripheral and antimigraine vasodilators •To drawn up the personal form (P-drugs) of this group of drugs	Clinical pharmacology of venotropic, angioprotective, antimigraine, cerebral and peripheral vasodilators
Theme 16	
•to know the minimum complex of investigative methods for assessing the pharmacodynamic effect of lipid-lowering preparations and used in obezity osteoporosis •to show the analysis and evaluation of pharmacodynamic study of lipid-lowering preparations and used in obezity osteoporosis •to predict possible complications and side effects of the drugs of studied groups •to predict the dependence of possible appearance of side effects on the dosage regimen and the functional status of the organs and systems of the body •to apply contemporary methods of pharmacological and non-pharmacological correction of side effects of lipid-lowering preparations and used in obezity osteoporosis •to display the necessary skills to drawn up the personal drugs form (P-drugs)	Clinical pharmacology of lipid-lowering preparations and used in obesity, osteoporosis.
Theme 17	
• • to know the complications of pharmacotherapy, side effects and methods of detecting them; • • to demonstrate the ability to analyze and assess the results of complications and true reactions to drugs; • • to know the types of drug interactions; • • to demonstrate capacities for analysis and appreciation of possible pharmacokinetic and pharmacodynamic interactions.	Complications of pharmacotherapy. Adverse drug reactions. Drug interactions.

VIII. PROFESSIONAL (SPECIFIC) (SC) AND TRANSVERSAL (TC) COMPETENCES AND STUDY FINDINGS

✓ **Professional (specific) competences (SC)**

CP1.Responsible execution of professional tasks with application of the values and norms of professional ethics, as well as the provisions of the legislation in force;

CP3. Resolving clinical situations by developing a plan for diagnosis, treatment and rehabilitation in various pathological situations and selecting appropriate therapeutic procedures for them, including providing emergency medical care;

CP4. Promoting a healthy lifestyle, applying prevention and gold-care measures;

CP6. Carrying out scientific research in the field of health and in other branches of science;

CP7. Promoting and ensuring the prestige of the medical profession and raising the professional

level;

CP8. Carrying out pedagogical and methodical-didactic activities within technical and professional higher education institutions in the field of health.

Transversal competences (TC)

CT1. Autonomy and responsibility in the activity.

Study finalizations

- ✓ At the end of the cycle, the student must have a broad knowledge of the classification and basic characteristics of drugs, drug belonging to certain groups, pharmacodynamics and pharmacokinetics of drugs, indications and contraindications regarding the use of drugs; side effects of drugs.
- ✓ The student should be able to analyze the action of drugs in terms of their pharmacological properties, to select the most effective and harmless drugs, to assess the possibility of using drugs for diagnosis, prophylaxis and treatment; to use drugs under certain pathological conditions based on pharmacodynamic, pharmacokinetic, chronopharmacological and drug specific properties in different age groups, in patients with various comorbidities and in pregnant women, to predict drug interaction and their biotransformation in the body.
- ✓ The student must acquire the necessary skills to assess the possibility of using drugs for the treatment and prevention of various diseases and pathologies.
- ✓ The student shall drawn up the drug personal form at the end of the module.

IX. INDIVIDUAL WORK OF THE STUDENT

No.	Expected product	Implementation strategies	Evaluation criteria	Deadline
1.	Brief characterization of the main drug preparations	Based on the material presented in module of the methodical guidelines for practical clinical pharmacology, using clinical protocols, pharmacotherapeutic form and drug guides, the student will accumulate, systematize and drawn up his list of mandatory drugs, which shall include: common international name of the drugs, synonyms, forms of delivery, mode of administration, (therapeutic, maximal) doses, indications, contraindications, side effects.	The volume of work, the presence of the characterization of all the drugs specified in the methodical indications, the sources used for accomplishing the individual work, the student shall know all the presented things.	Throughout the module
2.	Medical recipe exercises	Based on the methodical guidelines for practical clinical pharmacology and using the drug guides (including the use of a brief characterization of his own main drugs), the student will prescribe the mandatory drugs in all delivery forms, with mandatory indication of the appropriate dosage regimen and disease in the instruction.	The volume of work, the presence of prescriptions for all medicines and their forms of delivery, the observance of the rules of drug prescription, the quality of instruction, the ability of the student to prescribe the drug to another patient with possible other illness and / or comorbidities and physiological particularities.	Throughout the module
3.	Selection of	It will be performed on the basis of the methodology specified in the annex	Volume of work, quality of used sources, student	Throughout the module

	drugs according to the criteria of effectiveness, harmlessness, acceptability and cost, for inclusion in the personal form (P drugs)	"METHODOLOGICAL INDICATIONS ON THE RATIONAL SELECTION OF DRUGS" of the "Methodical indications for practical works in clinical pharmacology", with prior examples during practical classes and using the contemporary bibliographical sources (manuals, guides, protocols, publications).	argumentation of P drug selection, lack of plagiarism.	

X. METHODOLOGICAL SUGGESTIONS OF TEACHING-LEARNING-EVALUATION

XI. Methods used in teaching and learning

Clinical pharmacology is taught according to the classical principles of university studies (instruction), using the methods: exposure, interactive lecture, heuristic conversation, problem-solving, brainstorming, group work, individual study, work with textbook and scientific text, debate, solving problem situations, role play, simulation, interactive listening.

XII. Applied didactic strategies/technologies

Theoretically selected material from the literature, which is not contained in the available literature shall be taught at the lectures. At the seminars, the students will deepen their theoretical knowledge, will demonstrate the abilities of prescribing the drugs in the appropriate medicamentous forms; will fulfill the patient's clean-up protocol; will argue the prescription of elective drugs to the particular patient; will elucidate the pharmacological effects of prescribed drugs and will monitor the evolution of the clinical condition of the particular patient; will select the personal medicine (P-drug) based on the criteria of effectiveness, harmlessness, acceptability and cost; will determine drug administration schedules (P-treatment); will have the ability to fill in the information sheet on drugs side effects.

XIII. Methods of assessment *(including the final grade calculation method)*

Clinical Pharmacology discipline uses the following forms of assessment during the study:

A. Current:

- Test of primary knowledge of the course;
- Test of final knowledge of the course;
- Interactive discussion;
- Preparation of the treatment protocol;
- Solving clinical cases;

B. Final

Examen

Test of primary knowledge of the course includes medical recipe exercises, tests and general theoretical questions. Test of final knowledge of the course contains correlation tests, problem situations that need to be analyzed, and the application of the knowledge gained from self-training and interactive discussion. The clinical protocol (research paper) provides for the analysis of the medical treatment prescribed to the patient based on the knowledge gained in the self-instruction process, the interactive discussion, the solving of the clinical cases.

Examen test includes tests (100) of different types in SIMU or/and on-line in google.forms

Methods of mark rounding at the evaluation stages

Intermediate note grid (annual average mark, marks of the exam stages)	National mark system	ECTS equivalent
1,00-3,00	**2**	**F**
3,01-4,99	**4**	**FX**
5,00	**5**	**E**
5,01-5,50	**5,5**	
5,51-6,0	**6**	
6,01-6,50	**6,5**	**D**
6,51-7,00	**7**	
7,01-7,50	**7,5**	**C**
7,51-8,00	**8**	
8,01-8,50	**8,5**	**B**
8,51-8,00	**9**	
9,01-9,50	**9,5**	**A**
9,51-10,0	**10**	

The average annual mark and the marks of all stages of final examination (computer assisted, test, oral) - all will be expressed in numbers according to the evaluative scale (according to the table), and the final mark will be expressed in two decimal digits will be transferred to the student's record book.

Absence on examination without good reason shall be recorded as "absent" and is equivalent to 0 (zero). The student has the right to re-take the exam twice.

XIV. RECOMMENDED LITERATURE:

A. Compulsory:

In english :

1. Ghicavîi V.i et al. Prescription guide. Chişinău, Medicina, 2021.
2. Ghicavîi V., Bacinschi N., Guţu N., Stratu E., Gavriluţa V., Serbeniuc L., Chiriac T., Pogonea I. „Methodical indications for pharmacology laboratory works" CEP „Medicina". Chişinău, 2005, 2011
3. Richard A. Harvey; Pamela C. Champe; Mary J. Mycek and other. Lippincott's Illustrated Reviews, Pharmacology, 2nd edition. 2000, 5-edition 2018.
4. Anthony J. Trevor; Bertman G. Katzung; Susan B. Masters. Katzung & Trevor's Pharmacology. Examination & Board Review. Sixth edition, 2002, 2019.
5. H. P. Rang; M. M. Dale; J. M. Ritter Pharmacology, Fouth edition. Chuchill Livingstone. 1999.
6. Alfred Goodman Gilman, Louis S. Goodman, Alfred Gilman. "The Pharmacological Basis of therapeutics". Mc Graw Hill 2005, 2018.

B. Additional:

1. Clinical Pharmacology (edited by Professor. Ghicavîi V.). Chisinau, 2009.
2. Pharmacology (edited by Professor. Ghicavîi V.). Chisinau, 2010, 2012, 2019.
3. Clinical Pharmacology (self-assessment tests). Chisinau, 2000.
4. Ghicavii V. et al. Modern pharmacotherapy of digestive disorders. Chisinau, 2017.
5. Ghicavii V. Some aspects of rational use of medicines. Chisinau, 2002.
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