FACULTY OF MEDICINE 2

STUDY PROGRAM 0912.1 MEDICINE 2

PHARMACOLOGY AND CLINICAL PHARMACOLOGY DEPARTMENT

APPROVED
at the meeting of the Commission for Quality Assurance and Evaluation of the Curriculum in Medicine
Minutes No. 6 of 20.05.24
Chairman Associate Professor, PhD
Pădure Andrei _____

APPROVED
at the Council meeting of the Faculty of Medicine 2
Minutes No. 9 of 28.05.24
Dean of Faculty of Medicine 2
Associate Professor, PhD
Bețiu Mircea _____

APPROVED
At the meeting of the Committee of the
Pharmacology and Clinical Pharmacology Department
Minutes No. 21 of 15.04.2024
Head of department Professor, PhD
Bacinschi Nicolae _____

SYLLABUS

DISCIPLINE **CLINICAL PHARMACOLOGY**

Integrated studies / Cycle I, License

Tipe of course: **Compulsory**

Syllabus developed by the group of authors:
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I. INTRODUCTION

- **General presentation of the discipline: place and role of the discipline in the formation of the specific competences of the professional / 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 group characterization 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 under 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, paediatrics, endocrinology, neurology, obstetrics and gynaecology etc.) is required to master the clinical pharmacology.

- **Mission of the curriculum (aim) in professional training:**
  The basic aim of clinical pharmacology is to develop students' ability to apply knowledge about pharmacokinetics, pharmacodynamics, compatibility and adverse drug reactions for a rational and differential treatment of the patients.

- Language (s) of the discipline: English;
- Beneficiaries: students of the 5th year, Faculty of Medicine 2.

II. MANAGEMENT OF THE DISCIPLINE

Code of discipline		**S.10.O.089**	
Name of the discipline		**Clinical pharmacology**	
Person(s) in charge of the discipline		**PhD, Professor Bacinschi Nicolae**	
Year	**5th**	Semester/Semesters	**10th**
Total number of hours, including:			**60**
Lectures	**16**	Practical/laboratory hours	**16**
Seminars	**16**	Self-training	**12**
Form of assessment	**Test exam**	Number of credits	**2**

III. TRAINING AIMS WITHIN THE DISCIPLINE

At the end of the discipline study the student will be able to:

at the level of knowledge and understanding the students have to know:

- the compartments of clinical pharmacology and their importance;
- the basic principles of pharmacokinetics, pharmacogenetics and clinical pharmacodynamics;
- the fields of study of pharmacoeconomics, pharmacoepidemiology, pharmacovigilance, pharmacotoxicology, chronopharmacology and social pharmacology;
- the principles of classification of medicinal preparations (according to activity, duration of action, toxicity, clinical use, etc.);
- the mechanisms of action at the molecular and systemic level, the pharmacological effects and the corresponding clinical manifestations;
- indications, principles of selection and use of drug groups;
- contraindications, drugs adverse reactions and precautionary measures when administering drugs from different pharmacotherapeutic groups, as well as essential preparations;
- the etiotropic, pathogenetic and symptomatic action of medicinal preparations in the process of pharmacotherapy of diseases and pathological conditions;
- the drug surveillance system - Pharmacovigilance systems;
- notions of essential and vitally important drugs, as well as orphan and biosimilar medicines;
- the principles of referring medicines to OTC preparations;
- the principles of elaboration and purpose of the national and institutional Pharmaco-therapeutic form, of the medico-economic standards of diagnosis and treatment, and the national and institutional clinical protocols;
- the principles of personalized medication.

at the application level the student have:

- to carry out the medicinal anamnesis of the patient;
- to justify the prescription of medicinal preparations to the patient based on the pharmacokinetic, pharmacogenetic and pharmacodynamic properties of the preparation and the individual characteristics of the patient;
- to establish an optimal drug dosage regime with the selection of rational routes of administration depending on the pharmacodynamics, pharmacokinetics of the drug, age, gender and pathological conditions of the specific patient;
- to recommend the most effective and harmless combinations of medicinal substances in the concrete clinical situation;
- to predict the possibility of the development of adverse drug reactions and to use prevention or correction methods;
- to apply the principles of selecting P-medicines and P-treatment to the specific patient;
- to determine the effectiveness and harmlessness criteria of drug groups;
- to select information about the drug useful to the patient, in order to improve adherence and compliance with the administration regime;
- to implement in the practice drug surveillance system;
- to establish the criteria for monitoring the effect of medicines;
- to identify possible drug interactions and their consequences.

at the integration level students will be able:

- to appreciate the importance and place of clinical pharmacology among clinical disciplines;

- to demonstrate the necessity of clinical pharmacology, in order to establish a rational and harmless treatment;
- to analyze the results of pharmacokinetic and pharmacodynamic research of medicinal substances;
- to select the necessary complex of investigation methods for the assessment of the pharmacodynamic effects of medicinal remedies and the interpretation of the obtained results;
- to perform the analysis and synthesis of pharmacological and pharmacotherapeutic information from the specialized literature, according to evidence-based medicine;
- to formulate the principles of ethics and deontology in the performance of pharmacotherapy;
- to select the criteria of effectiveness and harmlessness of the drugs for arguing the expected treatment;
- to carry out the analysis of the pharmacotherapy of various ailments and diseases based on the unified standards of diagnosis and treatment;
- to assess the effectiveness and harmlessness of drugs in the pharmacotherapy process;
- to implement the criteria for monitoring drug treatment during the study of clinical disciplines;
- to develop scientific research projects in the field of clinical pharmacology.

IV. PROVISIONAL TERMS AND CONDITIONS

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 group 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 under 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, paediatrics, endocrinology, neurology, obstetrics and gynaecology etc.) Is required to master the clinical pharmacology.

In addition, the student must master information technologies (use of the internet, document processing, electronic tables and presentations, use of graphic programs) at an adequate level, communication skills and teamwork, as well as be tolerant, compassionate and autonomous.

V. THEMES AND ESTIMATE ALLOCATION OF HOURS

Lectures, practical hours/ laboratory hours/seminars and self-training

No. d/o	THEME	Number of hours		
		Lectures	Practical hours	Self-training
1.	Clinical pharmacology and current reforms in the drug field. The concept of the rational use of medicines. Preparation P-personal. Original and generic, biosimilar and orphan medicines. Bioequivalence of medicines. Notion of	2	2	

No. d/o	THEME	Number of hours		
		Lectures	Practical hours	Self-training
	compliance and ways to increase it. Self-treatment (self-medication). Pharmacokinetics, pharmacogenetics and clinical pharmacodynamics. Therapeutic drug monitoring: indications and interpretations. The principles of rational selection of medicines and their practical application.			
2.	Clinical pharmacology of preparations used in diseases of the respiratory system. Clinical pharmacology of antiallergic preparations. Selection of personal medicines.		4	1
3.	Clinical pharmacology of preparations with influence on the functions of the digestive tube, liver, bile ducts and pancreas. Selection of personal medicines.	2	4	2
4.	Clinical pharmacology of antiarrhythmic, antianginal, used in heart failure, hemostatic and antithrombotic preparations. Selection of personal drugs.	2	4	2
5.	Clinical pharmacology of antihypertensive, antihypotensive and diuretic preparations. Selection of personal medicines.	2	4	2
6.	Clinical pharmacology of antibiotics and synthetic antibacterial agents, antiviral, antituberculosis and antifungal preparations. Selection of personal medicines.	2	4	2
7.	Clinical pharmacology of psychotropic preparations (antipsychotics, anxiolytics, sedatives, antidepressants, nootropics and CNS stimulants), hypnotics, symptomatic anticonvulsants, antiepileptics, antiparkinsonian and used in Altheimer's disease. Selection of personal medicines.	2	4	2
8.	Clinical pharmacology of thyroid gland preparations, antidiabetics and. glucocorticoids. Selection of personal medicines.	2	4	1
9.	Clinical pharmacology of analgesic and anti-inflammatory preparations.	2	2	
Total		**16**	**32**	

VI. PRACTICAL TOOLS PURCHASED AT THE END OF THE COURSE

Mandatory essential practical tools are:

1. To carry out a review of the literature on the problems of clinical pharmacology in a certain field.
2. To analyze the results of pharmacodynamic and pharmacokinetic research of medicinal preparations.
3. To select the methods of clinical, paraclinical and laboratory investigations to assess the therapeutic effects of the medications used by the patient.

4. To make an appropriate choice to determine the most effective and harmless medications for the given patient.
5. To select the optimal dosage regimen and administration routes, based on the pharmacokinetic and pharmacodynamic characteristics, 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 drugs and/or combined preparations in the concrete clinical situation, based on the basic principles of rational pharmacotherapy (effectiveness, harmlessness and treatment cost).
7. To forecast and detect possible adverse reactions at the initial stages; to carry out their prophylaxis and treatment (correction).
8. To present the necessary information to the patient to co-opt him in the curative process and increase his responsibility towards the treatment carried out and his health.
9. To implement in medical practice contemporary data about rational pharmacotherapy, and pharmacological preparations, including new ones.
10. To use the knowledge obtained regarding pharmacokinetics, pharmacodynamics, the interaction of drugs 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 accessible drugs.
12. To select the most necessary complex investigation methods for the assessment of the pharmacodynamic effects of the drugs and the interpretation of the obtained data.
13. To know the selection principles of P-drugs and P-treatment.
14. To apply pharmacokinetic and pharmacodynamic principles to the rational use of preparations through P-drugs and P-treatment
15. To know the requirements for carrying out investigations and clinical tests of imported and indigenous medicines.
16. To know the method and principles for the development and use of the pharmacotherapeutic formula and 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 supervision and pharmacovigilance of medicines.

VII. OBJECTIVES AND CONTENT UNITS

Objective	Content units
Theme (chapter) 1.	
-To know the current reforms in the field of medicine, - to know the concept of the rational use of medicines, the formulary system and the indications for performing therapeutic medicinal monitoring. - to identify original and generic preparations; - to appreciate the particularities of biosimilar and orphan drugs; - to know the notions of pharmaceutical, pharmacokinetic and therapeutic bioequivalence; -to estimate the impact of self-treatment on health. - to define the notions of pharmacokinetics, pharmacogenetics and clinical pharmacodynamics, therapeutic drug monitoring, pharmacotherapeutic form; - to apply the principles of rational selection of medicines, the P (personal)-drug selection method; - to integrate the pharmacokinetic, pharmacogenetic and pharmacodynamic properties of drugs to rationally select drugs.	1. Clinical pharmacology and current reforms in the field of medicine. 2. The concept of the rational use of medicines. 3. P (personal)-drug concept. The principles of rational selection of medicines and their practical application. 4. Pharmacokinetics, pharmacogenetics and clinical pharmacodynamics. 5. Therapeutic drug monitoring: indications and interpretations.
Theme (chapter) 2.	
-to define the notions of antitussive, expectorant, mucolytic, bronchodilator, analeptic and antiallergic drugs; - to know the pharmacodynamic and pharmacokinetic peculiarities of the antiallergic drugs and medications used in respiratory disorders; - to demonstrate skills in drawing up the personal formulary (P-drug); - to predict the occurrence of possible adverse reactions, to establish their dependence on the dosage regimen; -to integrate the principles of drug dosage, depending on group membership and the respective disease.	Clinical pharmacology of preparations used in respiratory disorders and antiallergic diseases. Selection of P (personal) - drugs.
Theme (chapter) 3.	

Objective	Content units
-to define the notions of antiulcer, prokinetic, antiflatulent, antidiarrheal, laxative, purgative, antiemetic, spasmolytic, hepatoprotective, choleretic, cholecystokinetic, cholelitholytic preparations, pancreatic enzyme replacement therapy; - to know the pharmacodynamic and pharmacokinetic peculiarities of the groups of preparations with influence on motility and secretory activity, liver and biliary diseases; - to demonstrate skills in drawing up the personal formulary (P-drug). - to apply the prediction of the occurrence of possible adverse reactions, to establish their dependence on the dosage regimen; -to integrate the principles of drug dosage, depending on group membership and the respective disease.	Clinical pharmacology of preparations with influence on the functions of the digestive system, liver, bile ducts and pancreas. Selection of personal medicines.
Theme (chapter) 4.	
- to define the notions of antiarrhythmic, antianginal, used in heart failure, hemostatic and antithrombotic drugs; - to know the pharmacodynamic and pharmacokinetic peculiarities of the groups of antiarrhythmic, antianginal, cardiotonic, cardiostimulatory, vasodilatory, hemostatic and antithrombotic drugs; - to demonstrate skills in drawing up the personal form (P-drugs); - to apply the prediction of the occurrence of possible adverse reactions, to establish their dependence on the dosage regimen; - to integrate the principles of drug dosage, depending on group membership and the disease.	Clinical pharmacology of antiarrhythmic, antianginal, used in heart failure, hemostatic and antithrombotic preparations. Selection of personal medicines.
Theme (chapter) 5.	
-to select the minimum complex of investigations, in order to appreciate the pharmacodynamic effect of drugs with antihypotensive, antihypertensive and diuretic action; - to analyze and evaluate the pharmacodynamics of antihypertensives, antihypotensives and diuretics; - to predict the possible complications and	Clinical pharmacology of antihypertensive, antihypotensive and diuretic preparations. Selection of personal medicines.

Objective	Content units
adverse reactions of the drugs in this group; - to estimate the dependence of drugs adverse reactions on the dosage regimen and the functional state of the heart and other organs and systems; - to apply contemporary methods of pharmacological correction of adverse reactions, caused by antihypertensive and antihypotensive drugs; -to draw up the personal formulary (P-drugs) in conditions accompanied by arterial hypo- or hypertension.	
Theme (chapter) 6.	
-to know the mechanisms of action and the particularities of the action of antibiotics, sulfonamides and chemotherapeutics of diverse chemical structure, antiviral, antituberculosis and antifungal preparations for their rational selection; -to demonstrate analysis skills and appreciation of the results of microbiological, laboratory and instrumental methods, to determine the effectiveness of antibiotics, sulfonamides and chemotherapeutics of diverse chemical structure, antiviral, antituberculosis and antifungal preparations for correcting the specific treatment; - to predict the possible complications and adverse reactions of antibiotics, sulfonamides and chemotherapeutics of diverse chemical structure, antiviral, antituberculosis and antifungal preparations; - to estimate the dependence of the adverse phenomena of the preparations, on the dosage regime and the functional state of the body's organs and systems; - to draw up the personal formulary (P-drugs).	Clinical pharmacology of antibiotics and synthetic antibacterial drugs, antiviral, antituberculosis and antifungal preparations. Selection of personal medicines.
Theme (chapter) 7.	
-to identify the minimum complex of investigation methods to assess the pharmacodynamic effect of psychotropics preparations (antipsychotics, anxiolytics, sedatives, antidepressants, nootropics and CNS stimulants), hypnotics, symptomatic anticonvulsants, antiepileptics,	Clinical pharmacology of psychotropic preparations (antipsychotics, anxiolytics, sedatives, antidepressants, nootropics and CNS stimulants), hypnotics, symptomatic anticonvulsants, antiepileptics, antiparkinsonian and used in Alzheimer's disease. Selection of personal medicines.

Objective	Content units
antiparkinsonian drugs and used in Alzheimer's disease; - to predict possible complications and adverse reactions of the drugs from studied groups; - to apply the analysis and evaluate the pharmacodynamics of drugs, using laboratory and instrumental methods; - to forecast the dependence of adverse reactions on the dosage regime and the functional state of the body's organs and systems; - to apply contemporary methods of prophylaxis and treatment of adverse drug reactions; - to predict the interaction of psychotropic preparations, including with each other and with other drugs.	
Theme (chapter) 8.	
- to select a minimal complex of investigation methods in order to assess the pharmacodynamic effect of thyroid hormone preparations, antidiabetics and glucocorticoids; - to appreciate the results of studying the pharmacodynamics of hormonal preparations of the thyroid gland, antidiabetics and glucocorticoids, obtained by laboratory and instrumental methods - to predict the possible complications and adverse reactions of the drugs in this group; - to estimate the dependence of adverse reactions on the dosage regime of these preparations 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 hormonal and antihormonal preparations;	Clinical pharmacology of thyroid gland preparations, antidiabetics and glucocorticoids. Selection of personal medicines.
Theme (chapter) 9.	
- to define the minimum set of investigation methods for assessing the pharmacodynamic effect of anti-inflammatory and analgesic preparations; - to analyze and appreciate the pharmacodynamics of anti-inflammatory and analgesic drugs;	Clinical pharmacology of analgesic and anti-inflammatory preparations.

Objective	Content units
- to predict the possible complications and side effects of anti-inflammatory and analgesic drugs, - to estimate the dependence of the occurrence of adverse reactions on the dosage regimen and functional state of the body's organs and systems; - to apply contemporary methods of pharmacological and non-pharmacological correction of side effects caused by anti-inflammatory drugs, antirheumatic and analgesic medications; - to possess the necessary skills to draw up the personal formulary (P-drugs).	

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

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

- SC 1. The selection of drugs and the justification of their prescription to patients both on the basis of the pharmacokinetic, pharmacogenetic and pharmacodynamic properties of the preparation, as well as the individual characteristics of the patient;
- SC 2. Determining the optimal dosage regime of medicines, with the selection of rational routes of administration depending on both the pharmacodynamics, pharmacokinetic parameters of the medicine, as well as the age, gender and pathological conditions of the specific patient, in order to improve compliance and compliance with the administration regime;
- SC 3. Determining the criteria of effectiveness and harmlessness of groups of drugs and, based on them, selecting P-drugs and P-treatment for the specific patient;
- SC 4. Selection of the necessary set of investigation methods for estimating the pharmacodynamic effects of drugs and interpretation of the obtained data.
- SC 5. Appreciation of possible drug interactions and their consequences (favorable or detrimental).
- SC 6. Monitoring and assessing the effectiveness and harmlessness of drug treatment, including forecasting, prophylaxis and treatment of adverse (secondary) effects of drug substances in the concrete clinical situation;
- SC 7. Implementation of the drug surveillance system in practice.

✓ **Transversal competences (TC)**

- TC 1. Preparation for abstract thinking, analysis, synthesis.
- TC 2. Improving the capacity for decision-making autonomy.
- TC 3. Formation of personal attitude.
- TC 4. Social interaction ability, group activity with different roles.
- TC 5. Participating in interdisciplinary projects, extracurricular activities.
- TC 6. Improving digital skills.
- TC 7. Development of different techniques to learn.
- TC 8. Selection of digital materials, critical analysis and formulation of conclusions.
- TC 9. Presentation of individual scientific projects.

✓ **Study finalities**

- At the end of the cycle, the student must have extensive knowledge in the classification and basic characteristics of drugs, the belonging of drugs to certain groups, the pharmacodynamics and pharmacokinetics of drugs, indications and contraindications regarding the use of drugs; side effects of drugs.
- The student must be able to analyze the action of drugs through the prism of their pharmacological properties, select the most effective and harmless drugs, evaluate the possibility of using drugs for diagnosis, prophylaxis and treatment; to use the drugs in certain pathological conditions based on the pharmacodynamic, pharmacokinetic, chronopharmacological characteristics and the peculiarities of the action of the drugs in different age groups, in patients with various comorbidities and in pregnant women, to forecast the interaction of drugs and their biotransformation in the body.
- The student must acquire the necessary skills to evaluate the possibility of using drugs for the treatment and prevention of various diseases and pathological conditions.
- At the end of the module, the student have to draw up the personal medication formulary.

IX. STUDENT'S SELF-TRAINING

No.	Expected product	Implementation strategies	Assessment criteria	Implementation terms
1.	General prescription exercises	Prescription of mandatory drugs in the appropriate pharmaceutical forms available in medical practice.	Assessment of the correctness of the prescription of mandatory preparations in medicinal forms with the specification of the administration method and dosage regimen.	Throughout the module
2.	Medical prescription exercises	Based on the methodical indications for practical work in clinical pharmacology and using the drug guidelines, the student will prescribe the mandatory drugs in all forms of delivery, with the mandatory indication in the instruction of the corresponding dosage regimen and diseases.	The volume of work, the presence of prescriptions for all drugs and their forms of delivery, compliance with the rules for prescribing drugs, the quality of the instruction, the ability of the student to prescribe the drug to another patient, with a possible other disease and/or comorbidities and physiological peculiarities.	Throughout the modul
3.	Selection of drugs according to the criteria of effectiveness, harmlessness, acceptability	It will be performed on the basis of the methodology specified in the annex "METHODOLOGICAL INDICATIONS ON THE RATIONAL SELECTION OF DRUGS" of the "Methodical indications for practical works	Volume of work, quality of used sources, student argumentation of P drug selection, lack of plagiarism.	Throughout the module

	and cost, for inclusion in the personal form (P drugs)	in clinical pharmacology", with prior examples during practical classes and using the contemporary bibliographical sources (manuals, guides, protocols, publications).		

X. METHODOLOGICAL SUGGESTIONS FOR TEACHING-LEARNING-ASSESSMENT

XI. Teaching and learning methods used

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 (specific to the discipline) teaching 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, demonstrate the ability to prescribe the drugs in the appropriate dosage forms; fulfil the patient's examination protocol; argue the prescription of elective drugs to the particular patient; and 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, safety, acceptability and cost; will determine drug administration schedules (P-treatment); they will acquire the skills to complete the Adverse Drug Reaction Reporting form.

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

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

Current:

- evaluation of the student's individual work;
- discussion of thematic patients;
- assessment of knowledge of the theoretical part during the oral interview;
- solving clinical cases.

Final

- assessment of the student's individual work (grading in SIMU)
- evaluation of practical skills by evaluating the Clinical Report (instructive-didactic work) (grading in SIMU);
- Exam (tests in SIMU).

The Clinical Report (instructive-didactic work) provides for the analysis of the medicinal treatment prescribed to the patient based on the knowledge accumulated in the self-instructional process, the interactive discussion.

The exam includes 50 simple and multiple-choice questions in the SIMU system.

Mark rounding methods at different assessment stages

Intermediate marks scale (annual average, marks from the examination stages)	National Assessment 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**
8,51-9,00	**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) - are expressed in numbers according to the mark scale (according to the table), and the final mark obtained is expressed in number with two decimals, which is transferred to student's record-book.

Absence on examination without good reason is recorded as "absent" and is equivalent to 0 (zero). The student has the right to have two re-examinations in the failed exam.

XIV. RECOMMENDED LITERATURE:

A. Compulsory :

In english :

1. Bertman G. Katzung et al. Basic and Clinical Pharmacology, 14th edition, 2018.
2. Tripathi KD. Essentials of Medical Pharmacology, 8th edition, 2018.

B. Additional:

1. Richard A. Harvey; Pamela C. Champe; Mary J. Mycek and other. Lippincott's Illustrated Reviews, Pharmacology, 2nd edition. 2000, 5-edition 2018.
2. Anthony J. Trevor; Susan B. Masters. Katzung & Trevor's Pharmacology. Examination & Board Review. Sixth edition, 2002, 2019.
3. H. P. Rang; M. M. Dale; J. M. Ritter Pharmacology, Fouth edition. Chuchill Livingstone. 1999.
4. Alfred Goodman Gilman, Louis S. Goodman, Alfred Gilman. "The Pharmacological Basis of therapeutics". Mc Graw Hill 2005, 2018
5. Ghicavîi V. et al. Prescription guide. Chișinău, Medicina, 2021.

6. Ghicavîi V., Bacinschi N., Guțu N., Stratu E., Gavriluța V., Serbeniuc L., Chiriac T., Pogonea I. „Methodical indications for pharmacology laboratory works" CEP „Medicina". Chișinău, 2005, 2011
7. Ghicavîi V. et al. Clinical cases in clinical pharmacology. Chișinău, Medicina, 2017.
8. Clinical Pharmacology (edited by Professor. Ghicavîi V.). Chisinau, 2009.
9. Pharmacology (edited by Professor. Ghicavîi V.). Chisinau, 2010, 2012, 2019.
10. Ghicavii V. et al. Modern pharmacotherapy of digestive disorders. Chisinau, 2017.
11. Kukes VG. Clinical pharmacology. GEOTAR M. Medicine, 2018.
12. Ghicavii V. Clinical Pharmacology Service in the Public (curative) Health Institution. Chisinau, 2010.
13. Drugs- basis of rational pharmacotherapy (edited by professor V. Ghicavii). Chisinau, 2013.