DISCIPLINE SHEET

ACADEMIC YEAR

2022-2023

1. DATA ABOUT THE STUDY PROGRAM

1.1 Institution of higher education	UNIVERSITY OF MEDICINE AND PHARMACY OF CRAIOVA
1.2 Faculty	**MEDICINE**
1.3 Department	4
1.4 Study Domain	HEALTH
1.5 Study cycle	LICENCE
1.6 Study program/ Qualification	MEDICINE

2. DATA ABOUT THE DISCIPLINE

2.1 DISCIPLINE NAME	**PHARMACOLOGY**				
2.2. Discipline code	MED31205				
2.3 The holder of course activities	PROF. ANDREI-ADRIAN TICA /PROF. CORENLIU CRISTIAN GEORGESCU /ASSOCIATE PROFFESOR CRISTIANA IULIA DUMITRESCU				
2.4 The holder of seminar activities	ASSOCIATE PROFFESOR CRISTIANA IULIA DUMITRESCU ASSOCIATE PROFFESOR ANDREEA LILI BĂRBULESCU				
2.5.Academic degree	PROFESSOR/ ASSOCIATE PROFFESOR				
2.6. Employment (base norm/associate)	BASE NORM				
2.7. Year of study	**III**	2.8. Semester	**I** **II**	2.9. Course type (content) 2.10. Regime of discipline (compulsoriness	**CFD**

3. THE ESTIMATED TOTAL TIME (teaching hours per semester)

I[st] SEMESTER

3.1 Number of hours per week	**4**	3.2 From which course	**2**	3.3 seminary/laboratory	**2**
3.4 Total hours in curriculum	**56**	3.5 From which course	**28**	3.6 seminary/laboratory	**28**
Time found distribution (hours)					
Study from manual, course support, bibliography, and notes					**12**
Additional documentation in the library, specialized electronic platforms and on the field					**10**
Training seminars / labs, homework, reports, portfolios, and essays					**10**
Tutoring					**2**
Examinations					**3**
Other activities, counselling, student scientific programs					**7**
3.7 Total hours of individual study	**44**				
3.9 Total hours per semester	**100**				
3.10 Number of credits)	**4**				

II[nd] SEMESTER

3.1 Number of hours per week	**4**	3.2 From which course	**2**	3.3 seminary/laboratory	**2**
3.4 Total hours in curriculum	**56**	3.5 From which course	**28**	3.6 seminary/laboratory	**28**
Time found distribution (hours)					
Study from manual, course support, bibliography, and notes					**8**
Additional documentation in the library, specialized electronic platforms and on the field					**4**
Training seminars / labs, homework, reports, portfolios, and essays					**2**
Tutoring					**2**
Examinations					**2**
Other activities, counselling, student scientific programs					**1**
3.7 Total hours of individual study	**19**				
3.9 Total hours per semester	**75**				
3.10 Number of credits)	**3**				

4. PREREQUISITES (where appropriate)

4.1 curriculum	The students must have a good knowledge of physiology, physiopathology, biochemistry, medical and surgical semiology.
4.2 competency	-

5. CONDITIONS (where appropriate)

5.1. of course deployment	Lecture Hall with projector / online
5.2. of seminary/ lab	Pharmacology lab/ online

deployment	Prepare in advance of the laboratory by individual study

6. SPECIFIC COMPETENCES ACCRUED	
PROFESSIONAL COMPETENCES	**C1 –** To be able to identify the illness and to determine the correct diagnosis of the disease (diseases). **C4 –** To address the health problems from the perspective of community specifics, demonstrating knowledge of community factors that influence individual, community and public health, **C5 -** To initiate and conduct a scientific research
TRANSVERSAL COMPETENCES	**CT1**. Autonomy and responsability • the acquisition of moral reference points, the formation of professional and civic attitudes, that will allow to the students to be fair, honest, helpful, understanding, nonconflictual, to cooperate and to be comprehensive in the face of suffering, to be available to help people, and to be interested in community development; • to know, to respect and to contribute to the development of moral values and professional ethics; • to learn how to recognize the problems when they arise, and provide solutions for solving them. **CT2**. Social interaction • to recognize and to have respect for diversity and multiculturalism; • to have or to learn how to develop teamwork skills; • to communicate orally and in writing the manner of work requirements, the obtained results, to consult with the team; • to engage themselves in voluntary activities, to know the essential problems of the community. **CT3.** Personal and professional development • to have opening to lifelong learning; • to be aware for self-study as a basis of personal autonomy and professional development; • to derive the optimum and creative potential in their own collective activities; • to know how to use information and communication technologies.

7. DISCIPLINE OBJECTIVES (based on the grid of specific competences acquired)

7.1 The general objective of the discipline	Understanding the definitions of Pharmacology and Drug. Learning how to write a medical prescription. Utilization of the experimental animal models for studying the pharmacodynamics and pharmacokinetic effect of the drugs.
7.2 The specific objectives of the discipline	Understanding the definition of drug receptor. Studying the specific mechanisms of action for the drugs. Linking the experimental data with clinical evaluation. Studying the secondary effects of the drugs and the possibilities to counteract them. Adapting the specific therapy in function of other associate diseases. Combined therapy: interrelations between the drugs simultaneously administered. Drugs of abuse: clinical signs of utilization, possibilities to treat the specific intoxication and methods to decrease the dependency

8. CONTENTS

8.1 Course (content units)	Hours
FIRST SEMESTER **I. General Pharmacology** Pharmacology definition. General characteristics of drugs. Affinity and intrinsical activity. Action mechanisms (physical, chemical, biochemical). Direct, indirect and mixed mechanisms. Agonists and antagonists. Site of action for drugs. Dose definition, types of doses. Concentration-effect curves and relation between drug dose and clinical response. Variation in drug responsiveness (factors that depend of drug and biological structure). Changes of biologic reactivity secondary to drug administration. Pharmacodynamics effects (therapeutic, adverse, toxic effects). Pharmacokinetic aspects (absorption, administration routes, plasma protein-binding, distribution, distribution volume, clearance, half-life, drug biotransformation, excretion of drugs). Bioavailability. Pharmacokinetic drug interactions. Pharmacodynamics drug interactions.	**4**

II. Drugs that act at synaptic and neuroeffector junctional sites Aspects of drug interaction on synaptic transmission. Major mechanisms of drugs at autonomic synapses. **Pharmacology of cholinergic nervous system** Functional stages of cholinergic mediation. Acetylcholine – synthesis, storage, release, interactions with cholinergic receptors, bio inactivation, cholinesterase system. Cholinergic receptors – types, topography. Muscarinic effects. Nicotinic effects. Muscarinic receptor agonists (choline esters, choline mimetic natural alkaloids and synthetic analogues). Reversible anticholinesterase agents. Irreversible anticholinesterase agents (organo-phosphorous agents, mechanism of action, pharmacodynamics and toxic effects, acute and chronic poisoning with organo-phosphorous compounds, antidote therapy for organo phosphorous compounds-cholinesterase reactivators). Muscarinic receptor antagonists (atropine, scopolamine and related belladona alkaloids), synthetic and semisynthetic substitutes for belladonna alkaloids with dominant mydriatic effect (homatropine, eucatropine, dibutolina). Agents acting as neuromuscular blocking agents (galamin, succinylcholine, d-tubocurarine, atracurium, pancuronium, piperacuronium, rocuronium, vecuromium) and autonomic ganglia (tetraethylammonium, pentolinium, azamethonium, pentolinium, mecamylamine, trimethaphan. pempidine). **Pharmacology of sympathetic nervous system** Functional stages of adrenergic mediation – synthesis, storage, release, interaction with adrenergic receptors, enzyme bio inactivation, uptake of sympathetic compounds). Adrenergic receptors (types, topography). Alpha and beta-adrenergic effects. Physiological basis of adrenergic receptor function. Mechanism of action – directly, indirectly and mixed acting agents. Sympathomimetic drugs: alpha, beta and alpha-beta. Sympathetic blocking agents: alpha-adrenergic receptor antagonists, beta-adrenergic blocking agents, neuro sympatholytic agents.	6
III. Pharmacology of the central nervous system Cortical stimulating drugs (methilxantines, amphetamines). Antidepressant agents (MAO inhibitors, tricyclic and tetracyclic compounds, selective serotonin reuptake inhibitors). General anesthetics (mechanism of action, stages and signs of anesthesia, narcotic types, neuroleptanalgesia). Sedative-hypnotics. Drugs used in seizures. Pharmacological management in Parkinsonism and other movement disorders. Skeletal muscle relaxants. Opioid analgesics and antagonists.	8
IV. Autacoids -Eicosanoids. -Growth factors. -Cytokines. -Platelet activating factor. -Serotonin. Drugs that increase and drugs that decrease serotonin transmission.	2
V. Histamine and anti-histamine	1
VI. Non-steroidal anti-inflammatory drugs	2
VII. Steroidal anti-inflammatory drugs	2
VIII. Local anesthetics	1
IX. Vitamins	2
SECOND SEMESTER **I. Drugs activating on cardio-vascular system** Cardiac glycosides and other drugs used in congestive heart failure. Antiarrhythmics drugs. Antihyperntensive agents. Vasodilators and the treatment of the angina pectoris.	6
II. Drugs used in respiratory diseases Respiratory analeptics. Bronchodilators and other agents used in asthma. Drugs that depress cough reflex. Secretostimulants and mucolytic agents.	2
III. Drugs acting on the blood and blood forming organs Agents used in anemia: hematopoietic growth factors, minerals and vitamins. Drugs used in disorders of coagulation. Thrombolytic, antifibrinolytic and antiplatelet drugs	2
IV. Drugs acting on the gastro-intestinal function Agents for control of gastric acidity and the treatment of peptic ulcers (promoters of gastric secretion, H2-histamine antagonists, inhibitors of H+/K+/ATP-ase, anticholinergic agents, anti-gastrin agents, antacids, sucralfate, prostaglandins analogues). Agents affecting gastrointestinal motility: emesis and antiemetics; bile acids, choleretic and cholecyst kinetic agents and pancreatic enzymes. Antispastics.	4

V. Drugs used in renal diseases Diuretics (carboanhydrase inhibitors, thiazide and thiazide-like diuretics, osmotic diuretics, loop diuretics, K+-sparing diuretics). Antidiuretics.	1
VI. Drugs used in disturbance of uterine motility Agents affecting uterine motility (oxytocine, ergot alkaloids, prostaglandins, beta2-adrenergic receptor agonists, magnesium sulphate, prostaglandin-synthetase inhibitors).	1
VII. Hormones and hormone antagonists Adenohypophyseal hormones and their releasing factors. Adrenocorticosteroid hormones and their synthetic analogues. Thyroid and antithyroid drugs. Insulin, oral hypoglycemic agents and the pharmacology of endocrine pancreas. Androgens, estrogens and progestins. Anabolizant drugs.	4
VIII. Antibiotics and antimicrobial chemotherapy Antimicrobial agents: general considerations. Penicillins, cephalosporins and other beta-lactams. Tetracyclines, chloramphenicol. Aminoglycosides. Macrolides. Sulfonamides, trimethoprim-sulfamethoxazole. Urinary antiseptics. Drugs used in the chemotherapy of tuberculosis. Antiviral agents. Antifungal agents. Disinfectants, antiseptics. Chemotherapy of parasitic infections.	6
IX. Antineoplastic drugs	2
BIBLIOGRAPHY 1. Farmacologie curs. Andrei Tica (sub red.) EMU 2002. 2. Course. 3. Farmacologie, curs, ediția a II-a. Corneliu Cristian Georgescu. EMU 2013. 4. Farmacologie. Andrei Tica, Victor Voicu (sub red.). EMU 2004. 5. Farmacologie. Editia a II-a revizuita si adaugita. Ion Fulga. Editura Medicală 2017. 6. Farmacologie Generală, ediția a II-a. Nicoleta Auelia Cristea. Editura Didactică și Pedagogică 2018. 7. Manual de Farmacoterapie, ediția a 10-a. Wells BG, Schwinghammer TL, DiPiro JT, DiPiro CV. Editura Prior & Books 2019. 8. Farmacopeea Română. Ediția a X-a. Editura Medicală 2020. 9. Basic and Clinical Pharmacology, 14th edition. Bertram Katzung (under red.); McGraw-hill Ed., 2017 10. The pharmacologic basics of therapeutics. Goodman & Gillman. 13th edition. Mc Graw Hill education 2018.	
8.2 Practical work (topics / themes)	**Hours**
FIRST SEMESTER **I. Basic theoretical data on Pharmacology** -Romanian Pharmacopoeia; -Standard measurement units in Pharmacology; -Drugs – nomenclature; -Drugs – classification.	1
II. Types of medical preparations -Liquids; -Solids; -Semisolids; -Gazes.	5
III. Medical Receipt	2
IV. Experimental demonstrations on General Pharmacology 1.Calitative effect dependence on the way of drug administration. 2.Quantitative effect dependence on the way of drug administration. 3.Demonstration of enzymatic inductor effect of Phenobarbital. 4.Demonstration of the supper addition effect between sodium Pentothal and Chlorpromazine. 5.Demonstration of non-competitive antagonism between Phenobarbital and Strychnine. 6.Demonstration of competitive antagonism between Acetylcholine and Dextro-tubocurarine	 1 1 1 1 1 1

V. Experimental demonstrations on Central Nervous System	
1.Demonstration of convulsions induced by Strychnine, Pentetrazol and Caffeine.	1
2.Demonstration of Narcosis Periods.	1
3.Demonstration of volatile narcotics on tegument.	1
4.Demonstration of respiratory depressant effect of morphine and its antagonism by Nalorphine and Pentetrazol.	1
5.Straub phenomenon.	1
6.Demonstration of Chlorpromazine on spontaneous activity	1
VI. Medical prescriptions	8
SECOND SEMESTER	
I. Experimental demonstrations on cardio-vascular system	
1.Demonstration of the alpha-adrenomimetic-induced vasoconstriction and the alpha-adrenergic antagonists-induced vasodilatation.	1
2.Demonstration of vasoconstrictor effect of Angiotensin II and the antagonistic effect of Losartan.	1
3.Demonstration of Magnesium Sulphate on vascular smooth muscle.	1
4.Demonstration of vasodilator effect of Acetylcholine.	1
5.Demonstration of vasodilator effect of calcium channels blockers.	1
6.Demonstration of Digoxine effects on frog heart.	1
7.Demonstration of antiarrhythmic effect of beta-adrenergic antagonists	1
II. **Experimental demonstrations on digestive system**	
1.Demonstration of spasmolytic effect of atropine on intestinal smooth muscle.	1
III. Experimental demonstrations on myometrium	
1.Demonstration of ocytocic effect of Ergonovine.	1
2.Demonstration of ocytocic effect of Oxytocine.	1
3.Demonstration of ocytocic effect of Endotheline.	1
4.Demonstration of tocolytic effect of Nifedipine	1
5.Demonstration of tocytocic effect of AMPc.	1
IV. Medical prescriptions	15
BIBLIOGRAPHY	
1. 1. Farmacologie curs. Andrei Tica (sub red.) EMU 2002. 2. Course. 3. Farmacologie, curs, ediția a II-a. Corneliu Cristian Georgescu. EMU 2013. 4. Farmacologie. Andrei Tica, Victor Voicu (sub red.). EMU 2004. 5. Farmacologie. Editia a II-a revizuita si adaugita. Ion Fulga. Editura Medicală 2017. 6. Farmacologie Generală, ediția a II-a. Nicoleta Auelia Cristea. Editura Didactică și Pedagogică 2018. 7. Manual de Farmacoterapie, ediția a 10-a. Wells BG, Schwinghammer TL, DiPiro JT, DiPiro CV. Editura Prior & Books 2019. 8. Farmacopeea Română. Ediția a X-a. Editura Medicală 2020. 9. Basic and Clinical Pharmacology, 14th edition. Bertram Katzung (under red.); McGraw-hill Ed., 2017 10. The pharmacologic basics of therapeutics. Goodman & Gillman. 13th edition. Mc Graw Hill education 2018. 11. Caiet de lucrări practice de farmacologie. Oana Sorina Tica. Andrei Tica. Dan Hertzog. Florica Popescu. EMU2010.	

9. CORROBORATING THE DISCIPLINE CONTENT WITH THE EXPECTATIONS OF EPISTEMIC COMMUNITY REPRESENTATIVES, PROFESSIONAL ASSOCIATIONS AND EMPLOYEE REPRESENTATIVES RELATING TO THIS PROGRAM

- Pharmacology is a fundamental discipline, mandatory for a student in his preparation for becoming a doctor.
- The knowledges, practical skills and the attitudes learned on this discipline are offering the basics of therapeutics for the pathological processes that will be studied in other disciplines and it is the basis for comprehension and understanding and learning of every medical attitude regarding the prevention, curative and the recovery processes.

10. MHETODOLOGICAL LANDMARKS

Types of activity	Techniques of teaching / learning, materials, resources: lecture, interactive group work, learning based problems / projects audio-video recordings, etc.

Course	The lectures are based on the detailing of the information presented in digital way, in the same time with a permanent dialog with the students; individual and group learning, using audio-visual materials as a teaching method, syllabus and bibliography coverage Modern methods: online teaching. In case of special situations (alert states, emergency states, other types of situations that limit the physical presence of people) the activity can be carried out online using computer platforms approved by the faculty / university. The online education process will be adapted accordingly to ensure the fulfillment of all the objectives set out in the discipline sheet.
Practical work	Theoretical presentation of the experiments. Experiments performed by the students. Comments of the experiments results together with all the students Explanation, problem based learning, individual and group learning, experimental work, research work. In special situations (emergency or alert state, or other conditions that limit physical presence of the students and teachers) the activity can be sustained online, using programs according to university rules. The online education process will be adapted accordingly to ensure the fulfillment of all the objectives set out in the discipline sheet. The following combined methods are used: lecture, debate, problematization.
Individual study	Bibliography study. For the online version: lecture, debate, problematization based on materials provided in advance.

11. RECOVERY PROGRAM

	No. absences that can recover	**Location of deployment**	**Period**	**In charge**	**Scheduling of topics**
Absences recoveries	**3**	Pharmacology Department, Faculty of Medicine, Main building, Second floor/ online	The last week of the month	Teaching Assistant.	according with the absences and the curriculum of practical work
Schedule consultations / Students' Scientific Program	2h/week	Pharmacology Department, Faculty of Medicine, Main building, Second floor/ online	Weekly	All teaching assistants	According to students' needs and the curriculum
Program for students poorly trained	2h/week	Pharmacology Department, Faculty of Medicine, Main building, Second floor/ online	Weekly	All teaching assistants	According to the situation of each student Theme from that specific week

12. ASSESMENT

Activity	**Types of assesment**	**Methos of evaluation**	**Percentage from final grade**
Lecture	Formative assesment through essays, projects and surveys during the semester Summative assesment during the exam	Multiple Choice Questions Answering System (MCQ)/MCQ with the help of the IT platform in the online version.	80%
Practical work	Formative assesment through Multiple Choice Questions Answering System (MCQ) or/and descriptive, projects, survey during the semester. Periodic assesment during the semester Summative assesment during the exam	Multiple Choice Questions Answering System (MCQ) simultaneously with the one from the course / with the help of the video platform in the online version.	20%
Periodic assesment	Orally	-	-
Assesment of individual activity	Periodically, during the semester	-	-
Minimum performance standard	At least 50% for each component of the evaluation		

13. GUIDANCE AND COUNSELLING PROGRAMS		
Professional guidance and counselling programs (2 hours/monthly)		
Scheduling the hours	**Location**	**In charge**
Every last Friday of the month	Pharmacology Discipline, Second Floor, UMF/online	Lecture holders

Endorsement date in the department: 28.09.2022

Department Director,	**Coordinator of study program,**	**Discipline holder,**
Prof. Paul MITRUT	**Prof. Marius Eugen CIUREA**	**Prof. Andrei Adrian TICA**