



THIRD YEAR OF STUDIES

School year 2023/2024.

Subject:

PHARMACOLOGY AND TOXICOLOGY

The subject is valued with 12 ESCT. There are 4 hours of active classes per week (2 hours of lectures and 2 hours of exercises).

TEACHERS AND ASSOCIATES WHO PARTICIPATE IN TEACHING 2023/24:

RB	Name and surname	E-mail address	Title
1.	Slobodan Janković	sjankovic @ medf.kg.ac.rs	Professor
2.	Dragan Milovanovic	piki@ptt.rs	Professor
3.	Nataša Đorđević	natashadj2002@yahoo.com	Professor
4.	Jasmina Milovanović	jasminamilo@yahoo.com	Professor
5.	Dejana Ruzic Zecevic	dejana.zecevic@gmail.com	Assistant Professor
6.	Marina Kostić	marrina2006kg@yahoo.com	Professor
7.	Mihajlo Jakovljević	jakovljevicm @ medf.kg.ac.rs	Professor
8.	Radica Zivković Zarić	radica_zivkovic@yahoo.com	Assistant Professor
9.	Miloš Milosavljević	milosavljevicmilos91@gmail.com	Assistant Professor
10.	Ana Pejcic	anapejcic201502@yahoo.com	Assistant Professor

COURSE STRUCTURE:

Module	Name of the module	Weeks	Lectures weekly	Work in a small group per week	Teacher-leader of the module
1	GENERAL PHARMACOLOGY AND PHARMACOLOGY OF THE NERVOUS SYSTEM	10	2	2	prof. Dr. Slobodan Janković
2	ORGAN SYSTEM PHARMACOLOGY: • CARDIOVASCULAR SYSTEM • BLOOD AND TISSUES • RESPIRATORY TRACT • GASTROINTESTINAL TRACT • ENDOCRINE SYSTEM	10	2	2	prof. Dr. Slobodan Janković
3	ANTIMICROBIAL DRUGS, CYTOSTATICS, IMMUNOSUPPRESSANTS AND TOXICOLOGY	10	2	2	prof. Dr. Slobodan Janković
∑60+60=120					

ASSESSMENT:

The student masters the subject based on the activities during the class and the oral exam. The grade is equivalent to the number of obtained points (maximum 100). Points are earned in two ways:

ACTIVITY DURING THE LESSON: In this way, the student can earn up to 70 points in the following ways, according to the attached table:

- 1. 1 point each week if he/she regularly comes to class and participates in lectures and exercises, i.e. maximum 30 points.
- 2. by answering orally at the end of each module, a maximum of 40 points in total.

		MAXIMUM POINTS		
	MODULE	Regular and active attendance of classes	Oral answering at the end of the module	Σ
1	GENERAL PHARMACOLOGY AND PHARMACOLOGY OF THE NERVOUS SYSTEM	10	15	25
2	ORGAN SYSTEM PHARMACOLOGY: • CARDIOVASCULAR SYSTEM • BLOOD AND TISSUES • RESPIRATORY TRACT • GASTROINTESTINAL TRACT • ENDOCRINE SYSTEM	10	10	20
3	ANTIMICROBIAL DRUGS, CYTOSTATICS, IMMUNOSUPPRESSANTS AND TOXICOLOGY	10	15	25
	Σ	30	40	70

ORAL EXAMINATION: maximum **30** points.

The final grade is formed as follows:

In order to pass the subject a student must acquire minimum of 51 points .

The number of points earned	Grade
0 - 50	5
51 - 60	6
61 - 70	7
71 - 80	8
81 - 90	9
91 - 100	10

Committee in charge of oral examination:

Regular members: prof. dr Slobodan Janković, prof. dr. Dragan Milovanović, Assistant Professor dr Dejana Ružić Zečević,

Reserve members: prof. dr. Jasmina Milovanović, prof. dr. Nataša Đorđević, prof. dr. Mihajlo Jakovljević, prof. dr. Marina Kostić, Assist. Prof. dr. Radica Živković Zarić, Assist. Prof. Ana Pejčić and Assist. Prof. Miloš Milosavljević.

LITERATURE:

MODULE	TITLE OF THE TEXTBOOK	THE AUTHORS	PUBLISHER	LIBRARY	READING ROOM
1. GENERAL PHARMACOLOGY AND	Handbook of pharmacology and toxicology	Slobodan M. Jankovic	Faculty of Medical Sciences, Kragujevac, 2021	yes	yes
PHARMACOLOGY OF THE NERVOUS SYSTEM	Medical pharmacology at a glance	Neal, M. J.	Wiley Blackwell, 2016		
SISIEM	Manual for practical teaching in pharmacology and toxicology	Slobodan M. Jankovic, editor	Faculty of Medical Sciences, Kragujevac, 2018		
2. PHARMACOLOGY OF THE ORGAN SYSTEM:	Handbook of pharmacology and toxicology	Slobodan M. Jankovic	Faculty of Medical Sciences, Kragujevac, 2021		
 CARDIOVASCULAR SYSTEM BLOOD AND TISSUES 	Medical pharmacology at a glance	Neal, M. J.	Wiley Blackwell, 2016	yes	yes
 RESPIRATORY TRACT GASTROINTESTINAL TRACT ENDOCRINE SYSTEM 	Manual for practical teaching in pharmacology and toxicology	Slobodan M. Jankovic, editor	Faculty of Medical Sciences, Kragujevac, 2018		
3. ANTIMICROBIAL DRUGS,	Handbook of pharmacology and toxicology	Slobodan M. Jankovic	Faculty of Medical Sciences, Kragujevac, 2021		
CYTOSTATICS, IMMUNOSUPPRESSANTS AND	Medical pharmacology at a glance	Neal, M. J.	Wiley Blackwell, 2016	yes	yes
TOXICOLOGY	Manual for practical teaching in pharmacology and toxicology	Slobodan M. Jankovic, editor	Faculty of Medical Sciences, Kragujevac, 2018		

Power Point presentations of key lectures are available on the website of the Faculty of Medical Sciences: <u>www.medf.kg.ac.rs</u>

THE PROGRAM:

FIRST MODULE: GENERAL PHARMACOLOGY AND PHARMACOLOGY OF THE NERVOUS SYSTEM

TEACHING UNIT 1 (FIRST WEEK):

GENERAL PHARMACOLOGY

lectures 2 hours	exercises for 2 hours
Introduction to pharmacologyThe effect of drugs on the body	 Relationship between dose and drug effect Pharmacodynamic drug-drug interactions (antagonism and synergism)

TEACHING UNIT 2 (SECOND WEEK):

GENERAL PHARMACOLOGY

lectures 2 hours	exercises for 2 hours
Pharmacokinetics	 Calculation of basic pharmacokinetic parameters Pharmacokinetic drug-drug interactions

TEACHING UNIT 3 (THIRD WEEK):

AUTONOMOUS NERVOUS SYSTEM – PARASYMPATHICUS

lectures 2 hours	exercises for 2 hours
 General pharmacology of neurovegetative transmission Cholinergic and anticholinergic drugs Pharmacology of vegetative ganglia 	• Effect of cholinergic and anticholinergic drugs on arterial pressure in cats

TEACHING UNIT 4 (FOURTH WEEK):

AUTONOMOUS NERVOUS SYSTEM - SYMPATHICUS

lectures 2 hours	exercises for 2 hours
Adrenergic drugsAntiadrenergic drugsPharmacology of histamine and serotonin	• Effect of adrenergic drugs on the arterial pressure of the cat

TEACHING UNIT 5 (FIFTH WEEK):

AUTONOMOUS NERVOUS SYSTEM – CLINICAL CASES 1

lectures 2 hours	exercises for 2 hours
Clinical problems: Insecticide poisoning Pheochromocytoma Renal colic	• The influence of adrenergic blockers on the arterial pressure of cats

TEACHING UNIT 6 (SIXTH WEEK):

AUTONOMOUS NERVOUS SYSTEM – CLINICAL CASES 2

lectures 2 hours	exercises for 2 hours
 Pharmacology of neuro-muscular junction Clinical problems: Allergic reaction type 1 Glaucoma 	• The effect of myorelaxant drugs on striated musculature

UNIT 7 (SEVENTH WEEK):

CENTRAL NERVOUS SYSTEM 1

lectures 2 hours	exercises for 2 hours
 General principles of neurotransmission Principles of treatment of psychosis Principles of depression treatment Treatment of anxiety and insomnia 	Methods of testing psychopharmaceuticalsAcute barbiturate poisoning

UNIT 8 (EIGHTH WEEK):

CENTRAL NERVOUS SYSTEM 2

lectures 2 hours	exercises for 2 hours
 Anesthesia Treatment of epilepsy Alcoholism Epileptic seizure 	• Effect of morphine on rabbit respiration

CENTRAL NERVOUS SYSTEM 3

lectures 2 hours	exercises for 2 hours
 Pain therapy Addiction pharmacology Clinical problems: Addicted to psychostimulants 	• Working with pharmacological databases on the Internet

UNIT 10 (TENTH WEEK):

CENTRAL NERVOUS SYSTEM 4

lectures 2 hours	exercises for 2 hours
 Clinical problems: Adverse effects of antipsychotics Acute mania Preparing patients for general anesthesia Parkinson's disease 	• Oral examination of the material from the first 10 weeks

SECOND MODULE: PHARMACOLOGY OF ORGAN SYSTEMS

UNIT 11 (ELEVENTH WEEK):

CARDIOVASCULAR SYSTEM 1

lectures 2 hours	exercises for 2 hours
• Principles of heart failure treatment	
Clinical problems:	Cardiotonic glycosides poisoning
Cardiac decompensation	

UNIT 12 (TWELVTH WEEK):

CARDIOVASCULAR SYSTEM 2

lectures 2 hours	exercises for 2 hours
Principles of edema treatment	
Clinical problems:MigraineCardiac arrest	• Uterotonics and tocolytics

CARDIOVASCULAR SYSTEM 3

lectures 2 hours	exercises for 2 hours
 Principles of treatment of arterial hypertension Principles of treatment of coronary disease Principles of treatment of cardiac arrhythmias Clinical problems: Arterial hypertension 	• Evidence-based medicine: an analysis of the validity and practical significance of clinical studies

UNIT 14 (FOURTEENTH WEEK):

CARDIOVASCULAR SYSTEM 4

lectures 2 hours	exercises for 2 hours
 Treatment of disorders of peripheral circulation Treatment of hyperlipoproteinemia and atherosclerosis Clinical problems: Angina pectoris 	• Design of clinical trials with drugs and principles of Good Clinical Practice

UNIT 15 (FIFTHEENTH WEEK):

CARDIOVASCULAR SYSTEM 5

lectures 2 hours	exercises for 2 hours
• Pharmacology of water and electrolytes	
Clinical problems: Cardiac arrhythmia Intermittent claudication Hyperlipidemia	• Effect of drugs on coronary blood flow and the isolated heart

UNIT 16 (SIXTEENTH WEEK):

RESPIRATORY TRACT

lectures 2 hours	exercises for 2 hours
 Principles of treatment of chronic obstructive pulmonary disease Clinical problems: Bronchial asthma 	• Distribution and origin of medicines; pharmacopoeia

UNIT 17 (SEVENTEENTH WEEK):

BLOOD AND TISSUES

lectures 2 hours	exercises for 2 hours
 Anticoagulants, antiplatelet drugs and coagulant agents Clinical problems: Anemia Burns 	Prescribing medicines; prescriptionPowders

UNIT 18 (EIGHTEENTH WEEK):

GASTROINTESTINAL TRACT

lectures 2 hours	exercises for 2 hours
 Principles of treatment of peptic ulcer Pharmacotherapy of vomiting Clinical problems: Treatment of constipation and diarrhea Implantation of hip endoprosthesis 	• Tablets

UNIT 19 (NINETEENTH WEEK):

ENDOCRINE SYSTEM 1

lectures 2 hours	exercises for 2 hours
 Pharmacology of the thyroid gland Pharmacology of the endocrine pancreas Clinical problems: Osteoporosis Hyperglycemic coma 	 Capsules and suppositories

UNIT 20 (TWENTIETH WEEK):

ENDOCRINE SYSTEM 2

lectures 2 hours	exercises for 2 hours
 Pharmacology of adrenal cortex Pharmacology of sterility and contraception Clinical problems: Gynecological bleeding Childbirth and puerperium 	• Oral examination of the material from the previous 10 weeks

THIRD MODULE: ANTIMICROBIAL DRUGS, CYTOSTATICS, IMMUNOSUPPRESSANTS AND TOXICOLOGY

UNIT 21 (TWENTY-FIRST WEEK):

lectures 2 hoursexercises for 2 hours• General principles of anti-infective therapyAntibiotics• AntibioticsClinical problems:• Bronchopneumonia and pyelonephritis• Solutions, mixtures, suspensions, syrups, enemas• Osteomyelitis• Osteomyelitis

ANTIBIOTICS

UNIT 22 (TWENTY-SECOND WEEK):

ANTIFUNGAL DRUGS

lectures 2 hours	exercises for 2 hours		
Antifungal drugs			
Clinical problems:Fungal meningitis	• Drops		

UNIT 23 (TWENTY-THIRD WEEK):

ANTIVIRUS DRUGS

lectures 2 hours	exercises for 2 hours
Antiviral drugs	• Teas, macerates, infusions, decoctions, emulsions
Clinical problems:Acquired immunodeficiency syndrome	emuisions

UNIT 24 (TWENTY-FOURTH WEEK):

ANTI-PARASITIC DRUGS

lectures 2 hours	exercises for 2 hours	
Antiparasitic drugs		
Clinical problems: • Amebiasis • Ectoparasites • Candidiasis	• Injections, infusion solutions, inhalations	

UNIT 25 (TWENTY-FIFTH WEEK):

CYTOSTATICS

lectures 2 hours	exercises for 2 hours
• Principles of treatment of malignant diseases	• Ointments, pastes, gels, creams, wound
Clinical problemsLeukemia	dressings, vaccines and serums

UNIT 26 (TWENTY-SIXTH WEEK):

IMMUNOSUPPRESSANTS

lectures 2 hours	exercises for 2 hours		
Immunopharmacology			
Clinical problemsKidney transplantation	Bronchodilation		

UNIT 27 (TWENTY-SEVENTH WEEK):

TOXICOLOGY 1

lectures 2 hours	exercises for 2 hours	
 General principles of poisoning treatment Clinical problems: Coma in poisoned 	 Methods of measuring the concentration of drugs in the blood Methods of collecting data on side effects of drugs 	

UNIT 28 (TWENTY-EIGHT WEEK):

TOXICOLOGY 2

lectures 2 hours	exercises for 2 hours		
Antidots	Anatomical-Therapeutic-Chemical		
Clinical problems:Carbon monoxide poisoning	classification of drugs and defined daily doses		

UNIT 29 (TWENTY-NINETH WEEK):

lectures 2 hours	exercises for 2 hours	
Clinical problems: • Mushroom poisoning • Wilson's disease	• Individualized medication dosing	

TOXICOLOGY 3

UNIT 30 (THIRTIETH WEEK):

TOXICOLOGY 4

lectures 2 hours	exercises for 2 hours	
Clinical problems:Poisoning by a corrosive agentPesticide poisoning	• Oral examination of the material from the previous 10 weeks	

Consultations with teachers: every Friday, from 1 to 2 p.m., in the premises of the Department of Pharmacology (rooms 21 and 23)

LECTURE SCHEDULE

LITTLE HALL (MALA SALA)

TUESDAY 9:45 - 11:15

SCHEDULE OF EXERCISES

TUESDAY			
PATHOPHYSIOLOGICAL PATHOHYSTOLOGICAL			
EXERCISE ROOM (32)		EXERCISE ROOM (31)	
15:00 - 18:30		18:00-19:30	
I group	15:00-16:30	III group	15:00-16:30
II group	16:30-18:00	IV group	16:30-18:00

module	week	type	unit name	a teacher
1	1 – 31.10.2023.	L	General pharmacology. Pharmacodynamics.	Prof. Slobodan Janković
1	1 – 31.10.2023.	Е	Relationship between dose and drug effect, drug interactions (antagonism and synergism).	Prof. Slobodan Janković
1	2 – 7.11.2023.	L	Pharmacokinetics.	Prof. Slobodan Janković
1	2 – 7.11.2023.	Ε	Calculation of basic pharmacokinetic parameters.	Prof. Slobodan Janković
1	3 – 14.11.2023.	L	Vegetative nervous system - parasympathicus	Prof. Nataša Đorđević
1	3 – 14.11.2023.	Ε	Effect of cholinergic and anticholinergic drugs on cat's arterial pressure	Prof. Nataša Đorđević, Prof. Slobodan Janković
1	4 – 21.11.2023.	L	Vegetative nervous system - sympathicus	Prof. Nataša Đorđević
1	4 – 21.11.2023.	Ε	Effect of adrenergic drugs on cat's arterial pressure	Prof. Nataša Đorđević, Prof. Slobodan Janković
1	5 – 28.11.2023.	L	Vegetative nervous system – clinical cases 1	Prof. Jasmina Milovanović
1	5 – 28.11.2023.	Ε	The influence of adrenergic blockers on cat's arterial pressure	Prof. Jasmina Milovanović, Prof. Nataša Đorđević

module	week	type	unit name	a teacher
1	6- 5.12.2023.	L	Vegetative nervous system – clinical cases 2	Prof. Jasmina Milovanović
1	6- 5.12.2023.	Ε	Influence of myorelaxant drugs on striated musculature	Prof. Jasmina Milovanović, Prof. Nataša Đorđević
1	7 – 12.12.2023.	L	Central nervous system 1	Prof. Dragan Milovanovic
1	7 – 12.12.2023.	Ε	Methods of testing psychopharmaceuticals. Acute poisoning with barbiturates.	Prof. Dragan Milovanovic, Prof. Jasmina Milovanović
1	8- 19.12.2023.	L	Central nervous system 2	Prof. Dragan Milovanovic
1	8 – 19.12.2023.	Ε	Effect of morphine on rabbit respiration	Prof. Dragan Milovanovic, Prof. Jasmina Milovanović
1	9 – 26.12.2023.	L	Central nervous system 3	Prof. Mihajlo Jakovljević
1	9 – 26.12.2023.	Ε	Working with pharmacological databases on the Internet.	Assist . Prof. Radica Zivković Zarić, Prof. Dragan Milovanovic
1	10 – 9.1.2024.	L	Central nervous system 4	Prof. Mihajlo Jakovljević
1	10 - 9.1.2024.	Ε	Oral examination of the material from the first 10 weeks.	Assist . Prof. Radica Zivković Zarić, Prof. Slobodan Janković
2	$ \begin{array}{c c} 11 - \\ 16.1.2024. \end{array} $	L	Cardiovascular system 1	Prof. Marina Kostić

module	week	type	unit name	a teacher
2	11 – 16.1.2024.	Ε	Cardiotonic glycoside poisoning	Prof. Marina Kostić, Prof. Dragan Milovanovic
2	12 – 23.1.2024.	L	Cardiovascular system 2	Prof. Marina Kostić
2	12 – 23.1.2024.	Ε	Uterotonics and tocolytics	Prof. Marina Kostić, doc. Dr Ana Pejčić
2	13 – 30.1.2024.	L	Cardiovascular system 3	Assist. Prof. Dejana Ružić-Zečević
2	13 – 30.1.2024.	Ε	Evidence-based medicine: an analysis of the validity and practical significance of clinical studies.	Assist. Prof. Dejana Ružić-Zečević, Prof. Marina Kostić
2	14 – 20.2.2024.	L	Cardiovascular system 4	Assist. Prof. Dejana Ružić-Zečević
2	14 – 20.2.2024.	Ε	Design of clinical trials with drugs and principles of Good Clinical Practice	Assist. Prof. Dejana Ružić-Zečević, Prof. Marina Kostić
2	15 – 27.2.2024.	L	Cardiovascular system 5	Assist . Prof. Radica Zivković Zarić
2	15 – 27.2.2024.	Ε	Effect of drugs on coronary blood flow and isolated heart.	Assist . Prof. Radica Zivković Zarić, Assist. Prof. Dejana Ružić-Zečević

module	week	type	unit name	a teacher
2	16 – 5.3.2024.	L	Respiratory tract	Assist . Prof. Radica Zivković Zarić
2	16 – 5.3.2024.	Ε	Classification and origin of drugs; pharmacopoeia	Assist . Prof. Radica Zivković Zarić, Assist. Prof. Dejana Ružić-Zečević
2	17 – 12.3.2024.	L	Blood and tissues	Assist. Prof. Ana Pejčić
2	17 – 12.3.2024.	Ε	Prescribing medicines; prescription, Powders.	Assist. Prof. Ana Pejčić, Assist . Prof. Radica Zivković Zarić
2	18 – 19.3.2024	L	Gastrointestinal tract	Assist. Prof. Ana Pejčić,
2	18 – 19.3.2024.	Ε	Tablets	Assist. Prof. Ana Pejčić, Assist . Prof. Radica Zivković Zarić
2	19 – 26.3.2024.	L	Endocrine system 1	Prof. Jasmina Milovanović,
2	19 – 26.3.2024.	Ε	Capsules and suppositories	Prof. Jasmina Milovanović , Assist. Prof. Ana Pejčić
2	20 – 2.4.2024.	L	Endocrine system 2	Prof. Jasmina Milovanović
2	20 – 2.4.2024.	Ε	Oral examination of the material from the previous 10 weeks.	Prof. Jasmina Milovanović, Assist. Prof. Ana Pejčić

module	week	type	unit name	a teacher
3	21 – 9.4.2024.	L	Antibiotics	Assist. Prof. Dejana Ružić-Zečević
3	21 – 9.4.2024.	Ε	Solutions, mixtures, suspensions, syrups, enemas	Assist. Prof. Dejana Ružić-Zečević, Prof. Jasmina Milovanović
3	22 – 16.4.2024.	L	Antifungal drugs	Assist. Prof. Dejana Ružić-Zečević
3	22 – 16.4.2024.	Ε	Drops.	Assist. Prof. Dejana Ružić-Zečević, Prof. Jasmina Milovanović
3	23 – 23.4.2024.	L	Antiviral drugs	Assist Prof Miloš Milosavljević
3	23 – 23.4.2024.	Ε	Teas, macerates, infusions, decoctions, emulsions	Assist Prof Miloš Milosavljević, Assist. Prof. Dejana Ružić-Zečević
3	24 – 30.4.2024.	L	Antiparasitic drugs	Assist Prof Miloš Milosavljević
3	24 – 30.4.2024.	Ε	Injections, infusion solutions, inhalations	Assist Prof Miloš Milosavljević, Assist. Prof. Dejana Ružić-Zečević
3	25 – 7.5.2024.	L	Cytostatics	Prof. Mihajlo Jakovljević

module	week	type	unit name	a teacher
3	25 – 7.5.2024.	Ε	Ointments, pastes, gels, creams, woud dressings, vaccines and serums.	Assist Prof Miloš Milosavljević, Assist. Prof. Ana Pejčić
3	26 – 14.5.2024.	L	Immunosuppressants	Prof. Mihajlo Jakovljević
3	26 – 14.5.2024.	Ε	Bronchodilation.	Assist Prof Miloš Milosavljević, Assist. Prof. Ana Pejčić
3	27 – 21.5.2024.	L	Toxicology 1	Prof. Nataša Đorđević
3	27 – 21.5.2024.	Ε	Methods of measuring the concentration of drugs in the blood Methods of collecting data on side effects of drugs.	Prof. Nataša Đorđević, Prof. Marina Kostić
3	28 - 28.4.2024.	L	Toxicology 2	Prof. Nataša Đorđević
3	28 – 28.4.2024.	Ε	Anatomical-Therapeutic-Chemical classification of drugs and defined daily doses	Prof. Nataša Đorđević, Prof. Marina Kostić
3	29 – 4.6.2024.	L	Toxicology 3	Prof. Marina Kostić
3	29 – 4.6.2024.	Ε	Individualized medication dosing	Prof. Marina Kostić, Prof. Nataša Đorđević

module	week	type	unit name	a teacher
3	30 – 11.6.2024.	L	Toxicology 4	Prof. Marina Kostić
3	30 – 11.6.2024.	Е	Oral examination of the material from the previous 10 weeks.	Prof. Marina Kostić, Prof. Slobodan Janković
			EXAM (June term)	