

THIRD YEAR OF STUDIES

School year 2024/2025.

Subject:	
PHARMACOLOGY AND TOXICOLOGY	
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).	
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TEACHERS AND ASSOCIATES WHO PARTICIPATE IN TEACHING 2024/25:

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	Associated 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:	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.

		MAXIN	MUM 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:	10	10	20
3	ANTIMICROBIAL DRUGS, CYTOSTATICS, IMMUNOSUPPRESSANTS AND TOXICOLOGY	10	15	25
	$oldsymbol{\Sigma}$	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, Associated 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		
PHARMACOLOGY OF THE NERVOUS SYSTEM	Medical pharmacology at a glance	Neal, M. J.	Wiley Blackwell, 2016	yes	yes
SISIEW	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 SYSTEMBLOOD 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	yes	yes
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: www.medf.kg.ac.rs

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 	Effect of cholinergic and anticholinergic
 Cholinergic and anticholinergic drugs 	drugs on arterial pressure in cats
 Pharmacology of vegetative ganglia 	

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

UNIT 9 (NINTH WEEK):

CENTRAL NERVOUS SYSTEM 3

lectures 2 hours	exercises for 2 hours
 Pain therapy Addiction pharmacology	Working with pharmacological databases
Clinical problems: Addicted to psychostimulants	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: Migraine Cardiac arrest	Uterotonics and tocolytics

UNIT 13 (THIRTEENTH WEEK):

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:	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: 	• Tablets
 Treatment of constipation and diarrhea Implantation of hip endoprosthesis 	

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):

ANTIBIOTICS

lectures 2 hours	exercises for 2 hours
General principles of anti-infective therapyAntibiotics	
Clinical problems: Bronchopneumonia and pyelonephritis Sepsis Osteomyelitis	Solutions, mixtures, suspensions, syrups, enemas

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,
Clinical problems: • Acquired immunodeficiency syndrome	emulsions

UNIT 24 (TWENTY-FOURTH WEEK):

ANTI-PARASITIC DRUGS

lectures 2 hours	exercises for 2 hours
Antiparasitic drugs	
Clinical problems:	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 problems	dressings, vaccines and serums
 Leukemia 	

UNIT 26 (TWENTY-SIXTH WEEK):

IMMUNOSUPPRESSANTS

lectures 2 hours	exercises for 2 hours
Immunopharmacology	
Clinical problems • Kidney 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):

TOXICOLOGY 3

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

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)

WEEKLY COURSE SCHEDULE

COURSE	TUESDAY
PHARMACOLOGY AND TOXICOLOGY (2+2)	LECTURES 09:45 - 11:15 (H4) PRACTICE 15:00 - 18:00 (R31,R32)

module	week	type	unit name	a teacher
1	1 – 25.9.2024.	L	General pharmacology. Pharmacodynamics.	Prof. Slobodan Janković
1	1 – 25.9.2024.	${f E}$	Relationship between dose and drug effect, drug interactions (antagonism and synergism).	Prof. Slobodan Janković, Assist Prof Miloš Milosavljević
1	2 – 2.10.2024.	L	Pharmacokinetics.	Prof. Slobodan Janković
1	2 – 2.10.2024.	E	Calculation of basic pharmacokinetic parameters.	Assoc. Prof. Dejana Ružić-Zečević, Assist Prof Miloš Milosavljević
1	3 – 9.10.2024.	L	Vegetative nervous system - parasympathicus	Prof. Nataša Đorđević
1	3 – 9.10.2024.	E	Effect of cholinergic and anticholinergic drugs on cat's arterial pressure	Prof. Nataša Đorđević, Prof. Slobodan Janković
1	4 – 16.10.2024.	L	Vegetative nervous system - sympathicus	Prof. Nataša Đorđević
1	4 – 16.10.2024.	E	Effect of adrenergic drugs on cat's arterial pressure	Prof. Nataša Đorđević, Prof. Slobodan Janković
1	5 – 23.10.2024.	L	Vegetative nervous system – clinical cases 1	Prof. Jasmina Milovanović
1	5 – 23.10.2024.	E	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 – 30.10.2024.	L	Vegetative nervous system – clinical cases 2	Prof. Jasmina Milovanović
1	6 – 30.10.2024.	E	Influence of myorelaxant drugs on striated musculature	Prof. Jasmina Milovanović, Prof. Nataša Đorđević
1	7 – 6.11.2024.	L	Central nervous system 1	Prof. Dragan Milovanovic
1	7 – 6.11.2024.	E	Methods of testing psychopharmaceuticals. Acute poisoning with barbiturates.	Prof. Dragan Milovanovic, Prof. Jasmina Milovanović
1	8 – 13.11.2024.	L	Central nervous system 2	Prof. Dragan Milovanovic
1	8 – 13.11.2024.	E	Effect of morphine on rabbit respiration	Prof. Dragan Milovanovic, Prof. Jasmina Milovanović
1	9 – 20.11.2024.	L	Central nervous system 3	Prof. Mihajlo Jakovljević
1	9 – 20.11.2024.	E	Working with pharmacological databases on the Internet.	Assist . Prof. Radica Zivković Zarić, Prof. Dragan Milovanovic
1	10 – 27.11.2024.	L	Central nervous system 4	Prof. Mihajlo Jakovljević
1	10 – 27.11.2024.	E	Oral examination of the material from the first 10 weeks.	Prof. Slobodan Janković, Prof. Nataša Đorđević, Assist . Prof. Radica Zivković Zarić, Assist Prof Miloš Milosavljević,

module	week	type	unit name	a teacher
2	11 – 4.12.2024.	L	Cardiovascular system 1	Prof. Marina Kostić
2	11 – 4.12.2024.	E	Cardiotonic glycoside poisoning	Prof. Marina Kostić, Prof. Dragan Milovanovic
2	12 – 11.12.2024.	L	Cardiovascular system 2	Prof. Marina Kostić
2	12 – 11.12.2024.	E	Uterotonics and tocolytics	Prof. Marina Kostić, doc. Dr Ana Pejčić
2	13 – 18.12.2024.	L	Cardiovascular system 3	Assoc. Prof. Dejana Ružić-Zečević
2	13 – 18.12.2024.	E	Evidence-based medicine: an analysis of the validity and practical significance of clinical studies.	Assoc. Prof. Dejana Ružić-Zečević, Prof. Marina Kostić
2	14 – 25.12.2024.	L	Cardiovascular system 4	Assoc. Prof. Dejana Ružić-Zečević
2	14 – 25.12.2024.	E	Design of clinical trials with drugs and principles of Good Clinical Practice	Assoc. Prof. Dejana Ružić-Zečević, Prof. Marina Kostić
2	15 – 8.1.2024.	L	Cardiovascular system 5	Assist . Prof. Radica Zivković Zarić

module	week	type	unit name	a teacher
2	15 – 8.1.2024.	E	Effect of drugs on coronary blood flow and isolated heart.	Assist . Prof. Radica Zivković Zarić, Assoc. Prof. Dejana Ružić-Zečević
2	16 – 19.2.2025.	L	Respiratory tract	Assist . Prof. Radica Zivković Zarić
2	16 – 19.2.2025.	E	Classification and origin of drugs; pharmacopoeia	Assist. Prof. Radica Zivković Zarić, Assoc. Prof. Dejana Ružić-Zečević
2	17 – 26.2.2025.	L	Blood and tissues	Assist. Prof. Ana Pejčić
2	17 – 26.2.2025.	E	Prescribing medicines; prescription, Powders.	Assist. Prof. Ana Pejčić, Assist . Prof. Radica Zivković Zarić
2	18 – 5.3.2025.	L	Gastrointestinal tract	Assist. Prof. Ana Pejčić,
2	18 – 5.3.2025.	E	Tablets	Assist. Prof. Ana Pejčić, Assist . Prof. Radica Zivković Zarić
2	19 – 12.3.2025.	L	Endocrine system 1	Prof. Jasmina Milovanović,
2	19 – 12.3.2025.	E	Capsules and suppositories	Prof. Jasmina Milovanović, Assist. Prof. Ana Pejčić

module	week	type	unit name	a teacher
2	20 – 19.3.2025.	L	Endocrine system 2	Prof. Jasmina Milovanović
2	20 – 19.3.2025.	E	Oral examination of the material from the previous 10 weeks.	Prof. Jasmina Milovanović, Assist. Prof. Ana Pejčić, Prof. Marina Kostić, Assist Prof Miloš Milosavljević,
3	21 – 26.3.2025.	L	Antibiotics	Assoc. Prof. Dejana Ružić-Zečević
3	21 – 26.3.2025.	E	Solutions, mixtures, suspensions, syrups, enemas	Prof. Nataša Đorđević, Prof. Jasmina Milovanović
3	22 – 2.4.2025.	L	Antifungal drugs	Assoc. Prof. Dejana Ružić-Zečević
3	22 – 2.4.2025.	E	Drops.	Prof. Nataša Đorđević, Prof. Jasmina Milovanović
3	23 – 9.4.2025.	L	Antiviral drugs	Assist Prof Miloš Milosavljević
3	23 – 9.4.2025.	E	Teas, macerates, infusions, decoctions, emulsions	Assist Prof Miloš Milosavljević, Assoc. Prof. Dejana Ružić-Zečević
3	24 – 16.4.2025.	L	Antiparasitic drugs	Assist Prof Miloš Milosavljević
3	24 – 16.4.2025.	E	Injections, infusion solutions, inhalations	Ass. Prof. Miloš Milosavljević, Assoc. Prof. Dejana Ružić Zečević

module	week	type	unit name	a teacher
3	25 – 30.4.2025.	L	Cytostatics	Prof. Mihajlo Jakovljević
3	25 – 30.4.2025.	E	Ointments, pastes, gels, creams, wound dressings, vaccines and serums.	Assist Prof Miloš Milosavljević, Assist. Prof. Ana Pejčić
3	26 – 7.5.2025.	L	Immunosuppressants	Prof. Mihajlo Jakovljević
3	26 – 7.5.2025.	E	Bronchodilation. Methods of measuring the concentration of drugs in the blood.	Assist Prof Miloš Milosavljević, Assist. Prof. Ana Pejčić
3	27 14.5.2025.	L	Toxicology 1	Prof. Nataša Đorđević
3	27 14.5.2025.	E	ATC classification of drugs and defined daily doses	Prof. Nataša Đorđević, Prof. Marina Kostić
3	28 21.5.2025.	L	Toxicology 2	Prof. Nataša Đorđević
3	28 21.5.2025.	E	Individualized medication dosing	Prof. Nataša Đorđević, Prof. Marina Kostić
3	29 18.5.2025.	L	Toxicology 3	Prof. Marina Kostić

module	week	type	unit name	a teacher
3	29 18.5.2025.	E	Methods of collecting data on side effects of drugs.	Prof. Slobodan Janković Prof. Marina Kostić
3	30 4.6.2025.	L	Toxicology 4	Prof. Marina Kostić
3	30 4.6.2025.	E	Oral examination of the material from the previous 10 weeks.	Prof. Slobodan Janković Prof. Marina Kostić, Assoc. Prof. Dejana Ružić-Zečević, Prof. Nataša Đorđević
			EXAM (June term)	