PHARMACY
INTEGRATED ACADEMIC STUDIES

THIRD YEAR OF STUDY

TOXICOLOGY

2025/2026

Title of the course:

TOXICOLOGY

This course is assigned 4 ECTS credits.
It consists of 4 active teaching hours per week: 2 hours of lectures, 1 hour of seminars and 1 hour of practical classes.

TEACHERS:

	Name and surname	E-mail	Title
1.	Natasa Djordjevic	natashadj2002@yahoo.com	Full professor
2.	Slobodan Jankovic	sjankovic@fmn.kg.ac.rs	Full professor
3.	Jasmina Milovanovic	jasminamilo@yahoo.com	Full professor
4.	Marina Kostic	marrina2006kg@yahoo.com	Full professor
5.	Radica Zivkovic Zaric	radica_zivkovic@yahoo.com	Associate professor
6.	Milos Milosavljevic	milosavljevicmilos91@gmail.com	Assistant professor
7.	Ana Pejcic	anapejcic201502@yahoo.com	Assistant professor

COURSE STRUCTURE:

Module No	Title	No of weeks	Hours per week			Responsible teacher
			Lectures	Seminars	Practical classes	
1.	**Toxicology**	15	2	1	1	Milos Milosavljevic
						Σ 30+15+15=60

GRADING:

The grade will be equivalent to the number of points achieved (see the table). The points will be awarded according to the following scheme:

1. PRE-EXAM ACTIVITIES:

Based on participation in classes and demonstrated knowledge during exercises, a student can earn up to 2 points per class. In this way, a maximum of 30 points can be earned.

2. FINAL EXAM:

The student has the right to take the final exam only if they have previously earned more than 50% of the maximum number of points allocated for pre-exam activities, i.e., at least 16 points for class participation.

The final exam includes answering questions based on the material covered in the module, a follows:
a) 35 multiple-choice or fill-in-the-blank questions, each worth 2 points − up to 70 points can be earned in this section.
To pass the final exam, a student must earn more than 50% of the total points, which means at least 36 out of a maximum of 70 points.

FINAL GRADE

The final grade will be formed according to the following table:

Grading system		
Grade	**Total No of points**	**Description**
10	91-100	Excellent
9	81-90	Exceptionally good
8	71-80	Very good
7	61-70	Good
6	51-60	Passing
5	< 51	Failing

Literature

True B, Dreisbach RH, eds. Dreisbach's Handbook of Poisoning Prevention, Diagnosis and Treatment. 13th ed. London, UK; CRC Press; 2001.
Hodgson E, ed. A Textbook of Modern Toxicology. 3rd ed. New Jersey; John Wiley & Sons, Inc; 2004.
Williams PL, James RC, Roberts SM, eds. Principles of Toxicology. 2nd ed. New Jersey; John Wiley & Sons, Inc; 2000.
Olson KR, ed. Poisoning and Drug Overdose. 3rd ed. Stamford; Appleton & Lange; 1999.
Klaassen CD, ed. Casarett & Doull's Toxicology: The Basic Science of Poisons. 6th ed. New York: McGraw-Hill; 2001.

Schedule

Module 1:

COURSE UNIT 1 (WEEK 1): **Basic principles of toxicology**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Classification of toxins, toxicants, and poisons. Mechanisms of action of toxic substances. Toxicokinetics.	Emergency treatment of poisoning.	Principles of hemodialysis, hemoperfusion, and forced diuresis in poisoning

COURSE UNIT 2 (WEEK 2): **Diagnostic methods in toxicology**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Diagnosis and differential diagnosis of intoxication and poisoning. Exposure to known and potentially toxic substances.	Laboratory analyses in toxicology. Lethal dose and lethal concentration.	High Performance Liquid Chromatography (HPLC) in toxicology

COURSE UNIT 3 (WEEK 3): **Management of intoxication and poisoning**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Treatment of intoxication and poisoning. Management of common complications of poisoning.	Antidotes in poisoning.	Legal and medical responsibility of pharmacists in cases of intoxication and poisoning.

COURSE UNIT 4 (WEEK 4): **Exposure to toxic substances during pregnancy and breastfeeding**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Teratogenicity and fetotoxicity: medicines and toxic substances that should be avoided during pregnancy.	Exposure to medicines and toxic substances during breastfeeding.	Counseling services for drug use during pregnancy and breastfeeding.

COURSE UNIT 5 (WEEK 5): **Ecotoxicology**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Occupational toxicology. Toxic hazards of industrial and occupational chemicals. Occupational risk assessment. Exposure limits.	Environmental toxicology. Air pollution. Depleted uranium. Environmental risk assessment. Exposure limits.	Pollution of the human environment after the bombing of Serbia in 1999.

COURSE UNIT 6 (WEEK 6): **Toxicology of medicines acting on central nervous system**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Toxicity of drugs acting on CNS: antidepressants, sedatives, neuroleptics, lithium, antiepileptics	Toxicity of drugs acting on CNS: opioids use, abuse and overdose	Barbiturate overdose (case report/clinical problem)

COURSE UNIT 7 (WEEK 7): **Toxicology of medicines acting on cardiovascular system**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Toxicity of drugs acting on CVS: cardiotonic glycosides, antiarrhythmics, β-blockers	β-blocker overdose (case report/clinical problem)	Digoxin overdose (case report/clinical problem)

COURSE UNIT 8 (WEEK 8): **Toxicology of medicines affecting blood coagulation**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Toxicity of anticoagulants, antiplatelets, thrombolytics	Aspirin overdose (case report/clinical problem)	Warfarin overdose (case report/clinical problem)

COURSE UNIT 9 (WEEK 9): **Toxicology of antiseptics and disinfectants**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Toxicity of antiseptics: hydrogen peroxide, potassium permanganate, iodine, etc.	Toxicity of disinfectants: hypochlorite, isopropyl alcohol, etc.	Boric acid poisoning (case report/clinical problem)

COURSE UNIT 10 (WEEK 10): **Drug addiction and overdose**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Drug addiction and overdose: opioids, psychostimulants, inhalants, cannabis	Drug addiction and overdose: alcohol, nicotine	Alcohol intoxication (case report/clinical problem)

COURSE UNIT 11 (WEEK 11): **Toxicology of household products and nitrogen compounds**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Toxicity of household products: cleaners, detergents, garden chemicals, etc.	Toxicity of nitrogen compounds: aniline, dimethylaniline, nitroaniline, toluidine, nitrobenzene	Organophosphate poisoning (case report/clinical problem)

COURSE UNIT 12 (WEEK 12): **Toxicology of pesticides**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Toxicity of insecticides, herbicides, rodenticides, and fungicides.	Poisoning with various pesticides: barium, thallium, fluoroacetate, dinitrophenol, nicotine, paraquat.	Paraquat poisoning (case report/clinical problem)

COURSE UNIT 13 (WEEK 13): **Toxicology of halogen hydrocarbons and metals**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Toxicity of halogen hydrocarbons: biphenyls, carbon tetrachloride, etc.	Toxicity of metals: mercury, lead, iron, manganese. Chelation therapy	Lead poisoning (case report/clinical problem)

COURSE UNIT 14 (WEEK 14): **Toxicology of blood agents, nerve gases, and caustics**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Toxicity of blood agents: cyanide, sulfide, carbon-monoxide. Toxicity of nerve gases.	Toxicology of caustics: toxicity of strong acids and bases.	Acid ingestion (case report/clinical problem)

COURSE UNIT 15 (WEEK 15): **Venomous animals, and poisonous animals and plants**

Lectures: 2 hours	Seminars: 1 hour	Practical classes: 1 hour
Poisoning by venomous animals: snakes, black widow spider, scorpions	Poisonous animals and plants: common poisonings in our environment, measures of protection, treatment.	Snake bite (case report/clinical problem)

LECTURES AND PRACTICE

MONDAY

YELLOW ROOM 41 (R41)

15.15-18.15

Schedule of lectures, practical classes and tests – academic calendar

TOXICOLOGY: COURSE SCHEDULE

Module	Week	Type	Title	Teacher
1	1	L/S/P	Basic principles of toxicology	Milos Milosavljevic
	2	L/S/P	Diagnostic methods in toxicology	Natasa Djordjevic
	3	L/S/P	Management of intoxication and poisoning	Jasmina Milovanovic
	4	L/S/P	Exposure to toxic substances during pregnancy and breastfeeding	Slobodan Jankovic
	5	L/S/P	Ecotoxicology	Milos Milosavljevic
	6	L/S/P	Toxicology of medicines acting on central nervous system	Radica Zivkovic Zaric
	7	L/S/P	Toxicology of medicines acting on cardiovascular system	Milos Milosavljevic
	8	L/S/P	Toxicology of medicines affecting blood coagulation	Marina Kostic
	9	L/S/P	Toxicology of antiseptics and disinfectants	Ana Pejcic
	10	L/S/P	Drug addiction and overdose	Natasa Djordjevic

TOXICOLOGY: COURSE SCHEDULE

Module	Week	Type	Title	Teacher
1	11	L/S/P	Toxicology of household products and nitrogen compounds	Milos Milosavljevic
	12	L/S/P	Toxicology of pesticides	Ana Pejcic
	13	L/S/P	Toxicology of halogen hydrocarbons and metals	Marina Kostic
	14	L/S/P	Toxicology of blood agents, nerve gases, and caustics	Natasa Djordjevic
	15	L/S/P	Venomous animals, and poisonous animals and plants	Milos Milosavljevic
		E	**FINAL EXAM**	

L-lectures; S-seminars; P–practical classes, E-exam