

## Course description

<b>Course abbreviation:</b>	KAZ/TOXI	<b>Page:</b>	1 / 3
<b>Course name:</b>	Toxicology		
<b>Academic Year:</b>	2023/2024	<b>Printed:</b>	28.05.2024 05:22

<b>Department/Unit /</b>	KAZ / TOXI			<b>Academic Year</b>	2023/2024
<b>Title</b>	Toxicology			<b>Type of completion</b>	Exam
<b>Accredited/Credits</b>	Yes, 3 Cred.			<b>Type of completion</b>	Combined
<b>Number of hours</b>	Lecture 2 [Hours/Week] Tutorial 1 [Hours/Week]			<b>Course credit prior to</b>	YES
<b>Occ/max</b>	Status A	Status B	Status C	<b>Counted into average</b>	YES
<b>Summer semester</b>	0 / -	0 / -	0 / -	<b>Min. (B+C) students</b>	10
<b>Winter semester</b>	21 / -	0 / -	0 / -	<b>Repeated registration</b>	NO
<b>Timetable</b>	Yes			<b>Semester taught</b>	Winter semester
<b>Language of instruction</b>				<b>Internship duration</b>	0
<b>Optional course</b>	Yes			<b>Ev. sc. – cred.</b>	S N
<b>Evaluation scale</b>	1 2 3 4				
<b>No. of hours of on-premise</b>					
<b>Auto acc. of credit</b>	Yes in the case of a previous evaluation 4 nebo nic.				
<b>Periodicity</b>	K				
<b>Substituted course</b>	None				
<b>Preclusive courses</b>	N/A				
<b>Prerequisite courses</b>	N/A				
<b>Informally recommended courses</b>	N/A				
<b>Courses depending on this Course</b>	N/A				

### Course objectives:

Students will be familiar with problems of toxicology, poisoning symptoms and examination methods in toxicology.

### Requirements on student

Active participation in lessons, written credit test, oral examination.

### Content

Lectures:

1. Toxicology. Introduction, history, sub-disciplines (clinical, industrial, experimental, etc.). Resources and applications of toxicology.
2. Poisons. Definition, classification, labeling, dose-effect, toxicokinetics (entry, metabolism, excretion).
3. Types of materials. Sampling dates, treatment before analysis (isolation, extraction, separation, mineralization etc.).
4. Toxicological examination. The reasons, known - unknown exposure, screening, biological exposure tests - BET, the choice of the investigated substance according to the time of exposure, interpretation (maximum permissible limit, NPK).
5. Analytical techniques. Principles of quantitative methods (spectrophotometry, chromatography, immunochemical methods etc.).
6. Poisoning by agents blocking the oxygen transfer.
7. Poisoning by alcohols (ethanol, methanol, ethylene glycol).
8. Poisoning by heavy metals, solvents, "-icides" (herbicides, pesticides, fungicides), rarer types of poisoning.
9. Poisoning by substances from the life and domestic environment (plants, animals, chemist goods, medicinal products).
10. Drug levels monitoring (TDM), the pharmacokinetic evaluation.
11. Drugs and abused substances. Classification of groups and effects, screening, conventional drugs - new drugs.

Laboratory practicals:

1. Principles on the safety in the toxicological laboratory, instruments and equipment.
2. - 3. The biological material - types, quantity, method of preservation, processing time, documentation.
4. - 5. Adjustments of samples, deproteinization, extraction, hydrolysis, isolation mineralization.
6. Analytical methods in toxicology - immunochemical.
7. Analytical Methods in toxicology - chromatographic (TLC, GC, HPLC).

8. Analytical methods in toxicology - spectrophotometric (AAS, UV-VIS, IR).
9. Organization of work in a toxicological laboratory, toxicological analysis in the mode POCT, excursion to the lab.
10. Issues of the forensic toxicology (collection and preservation of material, accredited methods, apparatus equipment of the laboratory).
11. Written credit exam.

## Fields of study

## Guarantors and lecturers

- **Guarantors:** Prof. MUDr. Jaroslav Racek, DrSc. (100%)
- **Lecturer:** Prof. MUDr. Jaroslav Racek, DrSc. (100%), Ing. Václav Senft (100%), Ing. Ladislav Trefil (100%)
- **Tutorial lecturer:** Prof. MUDr. Jaroslav Racek, DrSc. (100%), Ing. Václav Senft (100%), Ing. Ladislav Trefil (100%)

## Literature

- **Basic:** Balíková, M. *Forenzní a klinická toxikologie*. Galén, Praha 2004.
- **Basic:** Lincová, D., Farghali, H. *Základní a aplikovaná farmakologie*. Galén, Praha 2006.
- **Recommended:** Katzung, B., G. *Basic and Clinical Pharmacology*. Lange medical books. McGraw-Hill, 2007.
- **Recommended:** Racek, J. a kol. *Klinická biochemie*. Galén, Praha, Karolinum, 2006.

## Time requirements

### All forms of study

Activities	Time requirements for activity [h]
Contact hours	33
Preparation for formative assessments (2-20)	2
Preparation for an examination (30-60)	45
<b>Total:</b>	<b>80</b>

## assessment methods

### Knowledge - knowledge achieved by taking this course are verified by the following means:

- Oral exam
- Test

### Skills - skills achieved by taking this course are verified by the following means:

- Skills demonstration during practicum

## prerequisite

### Knowledge - students are expected to possess the following knowledge before the course commences to finish it successfully:

- No particular prerequisites specified.

### Skills - students are expected to possess the following skills before the course commences to finish it successfully:

- No particular prerequisites specified.

## teaching methods

### Knowledge - the following training methods are used to achieve the required knowledge:

- Lecture

**Skills - the following training methods are used to achieve the required skills:**

Practicum

**learning outcomes****Knowledge - knowledge resulting from the course:**

The graduate will be able to carry out examinations of toxic substances in biological samples using selected analytical techniques.

- definuje toxickou látku a klasifikuje otravy podle působící noxy a příznaků
- vyjmenuje druhy toxikologických vyšetření
- interpretuje toxikologická vyšetření, zná nejvyšší přípustné limity.
- prokazuje širokou znalost o technikách odběru vzorku a úpravách před analýzou (izolace, extrakce, separace, mineralizace aj.).

**Skills - skills resulting from the course:**

- realizuje vyšetření toxické látky v biologickém materiálu pomocí vybraných analytických technik (imunochemických, chromatografických, spektrofotometrických).

**Course is included in study programmes:**

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Laboratory diagnostics in healthcare	Bachelor	Full-time	Medical laboratory technician	1	2019	2023	Povinné předměty	A	3	ZS