

Chemical safety Educational subject description sheet

Basic information

Didactic cycle 2023/24 Subject code BBTBTIS D 340K 01631 23			
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BB1B135_B151010.01051.25	Subject code BBTBTjS_D.340K.01631.23		
Lecture languages english			
Mandatory Obligatory subjects			
Block Major subjects	Block Major subjects		
Disciplines Biological sciences			
	1		
	Number of ECTS points 4		
	BBTBTJS_D.340K.01631.23 Lecture languages english Mandatory Obligatory subjects Block Major subjects Disciplines Biological sciences		

Goals

Code	Goal
C1	To familiarize students with the problems of the toxicology, classification, mechanism of action and fate in the organism of the poisons, including basics of toxicometry.
C2	To familiarize students with the basic sources of pollution, the fate of toxic compounds in the environment, biological effects on living organisms, systems and scopes of monitoring the presence of xenobiotics in the environment.
С3	Development of risk assessment skills resulting from the exposure to toxic compounds.

Entry requirements

Information on chemistry, animal physiology, biochemistry, fundamental physiological and biochemical processes taking place in animal and plant organisms.

Code	Outcomes in terms of	Effects	Examination methods
Knowledg	e - Student knows and understands:	^ 	
W1	the principles of chemical safety in the environment	BTj_K3_W03, BTj_K3_W05	Written exam
W2	the mechanism of action and consequences of toxic substances in the organisms	BTj_K3_W03, BTj_K3_W05, BTj_K3_W07_inz	Written exam
W3	the principles of chemical safety and its legal basis	BTj_K3_W03, BTj_K3_W07_inz, BTj_K3_W09	Written exam
Skills - Student can:			
U1	estimate the impact of toxic compounds on organisms and environment	BTj_K3_U08_inz, BTj_K3_U14_inz	Written exam
U2	collect toxicological data, including environmental aspects, select biological material for toxicological analysis and perform basic toxicological analysis	BTj_K3_U06_inz, BTj_K3_U07, BTj_K3_U11_inz	Written exam
U3	identify toxicological hazards based on the labeling of chemical substances and preparations	BTj_K3_U08_inz	Written exam
Social competences - Student is ready to:			
К1	put knowledge into practice	BTj_K3_K01, BTj_K3_K02, BTj_K3_K03	Written exam
К2	constantly update knowledge using objective sources of information	BTj_K3_K01, BTj_K3_K02	Written exam

Subject's learning outcomes

Study content

No.	Course content	Subject's learning outcomes	Activities
1.	Toxicology as a scientific discipline and its scope. Chemical safety, including the classification of poisons and methods and labeling in accordance with the latest regulations.	W3, U3, K1, K2	Lecture
2.	Toxicological relationships. Factors influencing the possibility of xenobiotic harmful effects on living organisms.	W1, W2, U1	Lecture, Laboratory exercises
3.	Toxokinetics, toxodynamics and the effects of poisons on organisms and the environment.	W2, U1, U2, K2	Lecture, Laboratory exercises
4.	Principles and scope of toxicometric tests required for placing xenobiotics (including biotechnological products) on the market. Chemical exposure level indicators.	W3, U3	Lecture
5.	Basics of toxicocological information collection, principles of collecting and sending samples for toxicological examination. Basics of toxicological analysis (methods of extracting poisons from biological material, their detection). Determination of the enzymatic profile of blood plasma and the activity of enzymes in tissues as an example of the assessment of the degree of toxic action of xenobiotics.	U2	Laboratory exercises

Course advanced

Activities	Methods of conducting classes	
Lecture	Lecture, Discussion, Presentation	
Laboratory exercises	Discussion, Presentation, Teamwork, Interpreting the results, Laboratory (experiment), learning by experiment	
Activities	Examination method	Percentage
Lecture	Written exam	70%
Laboratory exercises	Written exam	30%

Activities	Credit conditions
Lecture	 Only student who were present in at least 80% of laboratory classes are allowed to take part in the final exam. One written exam at the end of semester - 10 open questions (each for 5 points). Grading scale: Number of points Grade 0 - 25 2 (failed) 25.5 - 30 3 (sufficient) 30.5 - 35 3.5 (sufficient +) 35.5 - 40 4 (good) 40.5 - 45 4.5 (very good) 45.5 - 50 5 (excellent)

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Laboratory exercises	Only student who were present in at least 80% of laboratory classes are allowed to take part in the final exam. One written exam at the end of semester – 10 open questions (each for 5 points). Grading scale: Number of points Grade 0 - 25 2 (failed) 25.5 - 30 3 (sufficient) 30.5 - 35 3.5 (sufficient +) 35.5 - 40 4 (good) 40.5 - 45 4.5 (very good) 45.5 - 50 5 (excellent)

Literature

Obligatory

- 1. Klassen CD, Watkins JB (ed.), Casarett and Doull Essentials of toxicology, McGraw-Hill Education, 2021 (selected issues)
- 2. Veterinary Toxicology, RC Gupta (ed.), Elsevier, 2018 (selected issues)

Calculation of ECTS points

Activity form	Activity hours*
Lecture	30
Laboratory exercises	15
Self-study on the content covered in class	25
Preparation for the exam	30
Student workload	Hours 100
Number of ECTS points	ECTS 4

* hour means 45 minutes

Effects

Code	Content
ВТј_К3_К01	The graduate is ready to proper storage of data, updating and extending knowledge on topics related to biotechnology and the related sciences;
BTj_K3_K02	The graduate is ready to development and application of one's skills in practice (including communication, teamwork), which enable effective lifelong learning with respect to biological sciences;
BTj_K3_K03	The graduate is ready to for safe work via the selection and application of a proper technique of handling, storing and disposing of laboratory materials (e.g. using proper techniques in terms of handling, storing and disposing of bacteria, chemical substances and dangerous bio-waste);
BTj_K3_U06_inz	The graduate can use laboratory equipment in order to gather observations and data
BTj_K3_U07	The graduate can follow proper principles of safety and work ethics during the execution of scientific research using various experimental methods under laboratory and field conditions
BTj_K3_U08_inz	The graduate can assess the social, economic and legal conditions of the activities of a biotechnologist;
BTj_K3_U11_inz	The graduate can able to assess the usefulness of the available methods or devices and propose potentially the best solution when solving a practical problem related to the technological utilisation of biological material;
BTj_K3_U14_inz	The graduate can translate the results of experiments into practical solutions;
BTj_K3_W03	The graduate knows and understands key aspects of biotechnology
BTj_K3_W05	The graduate knows and understands the principles which define the three-dimensional structure of biological macromolecules, with the ability to explain and provide the examples of the relationship between structure and function
BTj_K3_W07_inz	The graduate knows and understands experimental methods serving the examination of important areas in the field of biotechnology, chemistry, biochemistry, biophysics, molecular biology and the related sciences;
BTj_K3_W09	The graduate knows and understands living organisms and their place in the natural environment, and how they can be used for the good of humanity;