1.	**Field of study**	**Biophysics**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2021/2022 (winter term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

Module: Pharmacology and Pharmacognosy

Module code: W4-2BF-MB-21-27

1. Number of the ECTS credits: 5

2. Learning outcomes of the module

code	description	learning outcomes of the programme	level of competence (scale 1-5)
MB_27_1	Student knows the basic concepts of pharmacy and pharmacognosy	KBF_K04 KBF_U03 KBF_W01 KBF_W02 KBF_W09	4 4 4 4 4
MB_27_2	Student learned the properties of active substances, their action in the body, side effects	KBF_K06 KBF_U03 KBF_W01 KBF_W02 KBF_W09	3 3 3 3 3
MB_27_3	Understands the basics of drug action mechanisms	KBF_K02 KBF_U03 KBF_W01 KBF_W02 KBF_W09	3 3 3 3 3
MB_27_4	Student learned about the chemical conditions of the use of active substances and the biochemical reactions at the cell level	KBF_K02 KBF_U03 KBF_W01	3 3 3

		KBF_W02 KBF_W09	3 3
MB_27_5	Student knows and understands the use of prodrugs generated by genetic engineering	KBF_K05 KBF_U03 KBF_W01 KBF_W02 KBF_W09	3 3 3 3 3
MB_27_6	Student knows how to use genomics technology in search of drugs	KBF_K05 KBF_U03 KBF_W01 KBF_W02 KBF_W09	3 3 3 3 3
MB_27_7	Student has the basic ability to work in a synthesis laboratory	KBF_K03 KBF_U03 KBF_W01 KBF_W02 KBF_W09	3 3 3 3 3

3. Module description	
Description	The content of the lecture includes: 1. Subject and basic concepts of pharmacology, pharmacy and pharmacognosy. 2. Drug nomenclature. Drug forms. 3. Drug properties and types of actions in the body. Side effects. Drug toxicity. 4. Factors affecting drug performance. Drug absorption. Fundamentals of drug action mechanisms. Non-specific drugs. 5. Drug distribution, redistribution and biotransformation. Drug excretion. Drug transport. 6. Chemical stability of the drug. Structural determinants of chemical stability. Structural factors affecting durability. 7. Drug metabolite. First phase processes 8. Pharmacokinetics. The concept of a model compartment. 9. Cell structure and drugs. Drugs in the organism. Basic information about the cell and cellular mechanisms of drug action. 10. Hydrophobicity vs hydrophilicity. Ionization of the drug. Lipinski rule and pharmacokinetics. 11. ADMET and pharmacokinetics. Pharmacokinetics and drug design. 12. Solubility and transport through membranes. The effect of acyl and alkyl substituents and their substitution on drug polarity. 13. Introduction of genes to cells. Antisense therapy. Prodrugs generated by genetic engineering. 14. Pharmacogenetics (pharmacogenomics). Genomics technology in the search for drugs. Laboratory - selected issues: 1) Oxidation reactions. Aromatic hydroxylation. Epoxidation of alkenes. 2) Oxidation of aliphatic and alicyclic carbon atoms. Oxidation of moieties containing a carbon-nitrogen connection. 3) Oxidation of the carbon-oxygen bond. 4) Reduction reactions. Reduction of the carbonyl group. Reduction of the nitro group. Azo group reduction. Reduction of tertiary amine oxides. Reductive halogen removal.

	5) Hydrolysis reactions. 6) Second phase processes - coupling reactions. Coupling with glucuronic acid. Coupling with sulfuric acid. Coupling with amino acids. Coupling with glutathione. Coupling with water. Coupling with acetic acid.
Prerequisites	

4. Assessment of the learning outcomes of the module

code	type	description	learning outcomes of the module
MB_27_w_1	credit	Positive assessment of the test allowing to perform a given exercise	MB_27_1, MB_27_2, MB_27_3, MB_27_4, MB_27_5, MB_27_6, MB_27_7
MB_27_w_2	written test/ oral examination	Written / oral exam from the material presented during the lecture	MB_27_1, MB_27_2, MB_27_3, MB_27_4, MB_27_5, MB_27_6, MB_27_7

5. Forms of teaching

code	form of teaching			required hours of student's own work		assessment of the learning outcomes of the module
	type	description (including teaching methods)	number of hours	description	number of hours	
MB_27_fs_1	laboratory classes	Self-performance of exercises, ability to prepare reports, ability to describe the results obtained	30	Preparation of a report on the given exercise	30	MB_27_w_1
MB_27_fs_2	lecture	The lecture is conducted with the use of multimedia resources, with the use of own presentations and materials from the e-learning platform	30	Supplementing the knowledge obtained during the lectures with additional literature. Using lectures posted on the e-learning platform	30	MB_27_w_2