

1.	Field of study	Biophysics			
2.	Faculty	Faculty of Science and Technology			
3.	Academic year of entry	y 2022/2023 (winter term), 2023/2024 (winter term), 2024/2025 (winter term), 2025/2026 (winter term)			
4.	Level of qualifications/degree	second-cycle studies			
5.	Degree profile	general academic			
6.	Mode of study	full-time			

Module: Specialized Lecture: Dielectric Spectroscopy in the Study of Dynamics of Biological Systems

Module code: W4-2BF-MB-21-24

1. Number of the ECTS credits: 3

2. Learning outcomes of the module					
code	description	learning outcomes of the programme	level of competence (scale 1-5)		
MB_24_1	Student knows elementary theory of interaction of electric field with dielectric materials	KBF_W01	4		
		outcomes of the programme KBF_W01 KBF_W07 KBF_L02 KBF_U02 KBF_U08 KBF_W02 KBF_W02 KBF_W04 KBF_W04 KBF_W01 KBF_W02 KBF_W02	4		
MB_24_2	Student knowns the basics of broadband dielectric spectroscopy measurements, how to apply it for the study of biological	KBF_K04	4		
	systems and how to analyse obtained dielectric measurements	KBF_U02	4		
		KBF_U08	4		
		KBF_W02	4		
		KBF_W04	4		
MB_24_3	Student knows theory of suspensions of particles in homogeneous fields	KBF_W01	4		
		KBF_W02	4		
MB_24_4	Student has knowledge of the applications of the phenomenon of dielectrophoresis for the study of small biological organisms	KBF_U04	4		
		KBF_W10	4		

3. Module description				
Description The content of the lecture includes: 1. Dielectric in a constant field (macroscopic and microscopic dielectric parameters, mechanisms of dielectric polarization, local field most phase transformations in dielectric measurements).				
	2. Dielectric in an alternating field (the phenomenon of dielectric relaxation: dipole and electrical conductivity).			
	3. Theoretical foundations of the phenomenon of polarization of heterogeneous media (two-, three- and multiphase systems, membranes).			



	4. The phenomenon of dielectrophoresis.5. Dielectric properties of selected biological materials (cells, tissues, proteins, blood, biopolymers)
Prerequisites	

4. Assessment	I. Assessment of the learning outcomes of the module						
code	type	description	learning outcomes of the module				
MB_24_w_1	exam		MB_24_1, MB_24_2, MB_24_3, MB_24_4				

5. Forms of teaching							
	form of teaching			required hours of student's own work		assessment of the	
code	type	description (including teaching methods)	number of hours	description	number of hours	learning outcomes of the module	
MB_24_fs_1	lecture	Detailed discussion by the lecturer of the issues listed in the table "module description" using the table or multimedia presentations		Supplementary reading, working with the textbook, trying to find answers to simple problem and questions asked during the lecture	20	MB_24_w_1	