

<b>1. Field of study</b>	<b>Biophysics</b>	
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:** 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

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

### **3. Module description**

<b>Description</b>	The content of the lecture includes: <ol style="list-style-type: none"> <li>1. Dielectric in a constant field (macroscopic and microscopic dielectric parameters, mechanisms of dielectric polarization, local field models and records of phase transformations in dielectric measurements).</li> <li>2. Dielectric in an alternating field (the phenomenon of dielectric relaxation: dipole and electrical conductivity).</li> <li>3. Theoretical foundations of the phenomenon of polarization of heterogeneous media (two-, three- and multiphase systems, membranes).</li> </ol>
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	4. The phenomenon of dielectrophoresis. 5. Dielectric properties of selected biological materials (cells, tissues, proteins, blood, biopolymers)
<b>Prerequisites</b>	

<b>4. Assessment of the learning outcomes of the module</b>			
<b>code</b>	<b>type</b>	<b>description</b>	<b>learning outcomes of the module</b>
MB_24_w_1	exam	Written test/oral exam	MB_24_1, MB_24_2, MB_24_3, MB_24_4

<b>5. Forms of teaching</b>						
<b>code</b>	<b>form of teaching</b>			<b>required hours of student's own work</b>		<b>assessment of the learning outcomes of the module</b>
	<b>type</b>	<b>description (including teaching methods)</b>	<b>number of hours</b>	<b>description</b>	<b>number of hours</b>	
MB_24_fs_1	lecture	Detailed discussion by the lecturer of the issues listed in the table "module description" using the table and/or multimedia presentations	30	Supplementary reading, working with the textbook, trying to find answers to simple problem and questions asked during the lecture	20	MB_24_w_1