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: Introduction to Optical Spectroscopy

Module code: W4-2BF-MB-21-07

1. Number of the ECTS credits: 6

2. Learning outcomes of the module

code	description	learning outcomes of the programme	level of competence (scale 1-5)
MB_07_1	students will gain the ability to analyze problems of optics involving nanomaterials, both for the analysis at the local scale and for the exploitation of their specific properties in devices and approaches	KBF_W02 KBF_W05 KBF_W07 KBF_W10	4 4 4 4
MB_07_2	students will develop cross-disciplinary abilities directly connected with other scientific areas	KBF_K10 KBF_W02	4 4

3. Module description

Description	Basics of radiation/matter interaction and understanding of emission/absorption spectra of substances in the range near- UV - IR, up to the THz range. Technical and conceptual tools for emission, absorption, Raman spectroscopy. Energy levels of the main physical systems: electronic levels in atoms and molecules, rotational and vibrational levels of molecules, Lorentz-Drude model, electronic levels of impurities (transition metals and rare earth) in crystals, electronic and phononic bands in crystals. Group theory applied to the main energy level systems mentioned above.
Prerequisites	

4. Assessment of the learning outcomes of the module

code	type	description	learning outcomes of the module
MB_07_w_1	exam	Oral final exam, partly fulfilled through a short presentation on a topic chosen in agreement	MB_07_1, MB_07_2

		with the lecturers	

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_07_fs_1	lecture	Detailed discussion by the lecturer of the issues listed in the table "module description" using the table and/or multimedia presentations	36	Supplementary reading, working with the textbook	104	MB_07_w_1