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: Solid State Physics

Module code: W4-2BF-MB-21-02

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_02_1	Students will be able to interpret the main experimental phenomenology of condensed matter - will obtain a sound knowledge of structural, electronic, optical, and vibrational properties of solids	KBF_K01 KBF_K10 KBF_U11 KBF_U13 KBF_W01 KBF_W02	4 4 4 4 4 4

3. Module description

Description	Electrons in a one-dimensional periodic potential. Electron tunneling through a periodic potential. Velocity, quasimomentum, and effective mass of an electron in a band. Geometric description of crystals: direct and reciprocal lattices. Von Laue and Bragg scattering. The Drude electron gas. The theory of Sommerfeld. Energy and density of states of a two-and three-dimensional electron gas in a magnetic field. De Haas van Alphen effect. Landau diamagnetism and Pauli paramagnetism. Theory of harmonic crystal. Phonons. Optical properties of semiconductors and insulators. Charge transport in intrinsic and doped semiconductors. Fermi level in intrinsic semiconductors. Law of mass action. Donor and acceptor levels. Fermi level in doped semiconductors.
Prerequisites	

4. Assessment of the learning outcomes of the module			
code	**type**	**description**	**learning outcomes of the module**
MB_02_w_1	exam	oral exam	MB_02_1

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_02_fs_1	lecture	Detailed discussion by the lecturer of the issues listed in the table "module description" using the table and/or multimedia presentations	48	Supplementary reading, working with the textbook	102	MB_02_w_1