

Study programme(s): Applied Mathematics (MB)				
Level: master				
Course title: Contemporary experimental physics 2				
Status: elective				
ECTS: 7				
Requirements: Electromagnetism, Optics				
Learning objectives Obtaining basic knowledge in models and methods in the field of physics of condensed matter, and potential applications of crystals, liquid crystals and quasicrystals in modern technology and techniques.				
Learning outcomes After completing and mastering the course content, students should possess: <ul style="list-style-type: none"> - Ability of analytical and scientific understanding of the physical processes in this area. - Ability to follow the relevant professional literature. - Understanding the structure of ordered state, partially ordered state, nanostructures and amorphous materials. - Knowledge of methods of obtaining material in a condensed state and possible applications. - Knowledge of characteristics of particular types of materials as a result of the dominant chemical bond. - Understanding the basic physical properties of solid materials. - Ability to transfer the acquired knowledge to other individuals and groups. 				
Syllabus <i>Theoretical instruction</i> Ordered state – crystals, partially ordered state – liquid crystals, quasicrystals, polymers, and nanostructured materials. Disordered systems. Structure and characteristics. The nature of chemical bonds. Bond energy parameters and phase transformations. Ordered systems. Principles of structural ordering. Ionic crystals. Metals. Covalent and molecular crystals. Crystals with hydrogen bond. Crystalline complexes. Processes and technologies of obtaining materials in the condensed state. Defect states in crystals. Phase diagrams and methods of obtaining amorphous materials. Properties of materials in the condensed state and investigation methods. Diffraction on the crystal lattice. Behavior of materials in mechanical field. Optical measurements. Spectroscopy in condensed state. <i>Practical instruction</i> Experimental and computational exercises that follow the content of lectures.				
Weekly teaching load				Other:
Lectures: 3	Exercises: 4	Other forms of teaching: 3	Student research:	