Level: master

Course title: Disordered systems

Status: obligatory

ECTS: 7

Requirements:

Learning objectives

Introducing the students to the field of non-crystalline systems.

Learning outcomes

- Upon completion of the course, students should have developed:
- General skills: following professional literature;
- Knowledge of the specificity of disordered and partially ordered systems;
- Knowledge of processes and technologies for obtaining materials;
- Ability to realize certain technical solutions;

- Ability of science-based understanding of the physical processes and interpretation of physical phenomena within materials with disordered and partially ordered internal structure.

Syllabus

Theoretical instruction

Partially ordered systems. The rules of ordering. The parameters of ordering. Structurally disordered systems. Phase transitions ordered to disordered systems.

Thermotropic and lyotropic liquid crystals.

Preparation, structure and properties of quasicrystals and nanocrystals.

Formation of macromolecules and structures of crystalline and amorphous polymers. The characteristics of polymeric materials.

Amorphous materials. Glasses and amorphous films. The structural properties. Physical and chemical properties of amorphous materials. Amorphous semiconducting materials. General characteristics. The theory of electron states in amorphous semiconductors. Alloying of amorphous semiconductors. Amorphous metals.

Clusters. General properties of atomic clusters. Synthesis and detection of atomic clusters. Nanostructured and cluster materials.

Electrical and dielectric properties of disordered materials.

Magnetic properties of disordered condensed materials.

Application of disordered condensed materials.

Practical instruction

Experimental exercises that accompany the content of lectures.

Weekly teaching load

weekiy teaching load				Other.
Lectures: 3	Exercises: 2	Other forms of teaching: 1	Student research:	

Other