

Level: PhD				
Course title: Nanostructures and nanomaterials				
Status: elective				
ECTS: 30				
Requirements:				
Learning objectives Acquiring up-to-date knowledge about models and properties of nanostructures and nanomaterials and their applications.				
Learning outcomes After completing the course, students should have developed: <ul style="list-style-type: none"> - Knowledge in processes and technologies of obtaining materials. - Ability of independent reading of professional literature and preparing the presentation of scientific research results. - Ability to creatively and independently carry out the experiments in order to obtain materials with specific and projected properties. - Ability to realize certain technical solutions. 				
Syllabus <i>Theoretical instruction</i> Definition of nanostructure, structure-property relations and classification of nanostructured materials. The energy of surfaces. The chemical potential and electrostatic stabilization. One-dimensional, two-dimensional and three-dimensional interactions. One-dimensional, two-dimensional and three-dimensional nanostructures. Special nanomaterials. Methods of obtaining: colloidal techniques, chemical and electrochemical methods, evaporation and condensation; plasma synthesis. Functionalization of nanoparticles. Characterization of nanomaterials: structure, chemical and physical properties, electrical conductivity, ferroelectric and dielectric properties; superparamagnetism. Application of nanostructured materials in medicine, electronics, telecommunication systems, information and aero-space technology. <i>Practical instruction</i> Student research and preparing and public presentation of seminars.				
Weekly teaching load				Other:
Lectures: 5	Exercises:	Other forms of teaching:	Student research: 15	