Name of the course	**Inorganic nonmetalic materials**
Number of instruction hours	20
Outline of course/module content	Structure and physical and chemical properties of solid matter: crystal state, crystal lattice energy, surface energy, structure of real crystals, non-stoichiometry and crystal defects. Methods of structure characterization: X-ray diffraction, spectroscopic techniques. Microstructure: polycrystalline monophasic and multiphasic systems. Methods of microstructure characterization: electron microscopy and atomic force microscopy. Thermodynamics of solid-state processes: phase diagrams, solid solutions. Diffusion in the solid state. Processes of nucleation and growth. Kinetics of processes in the solid-state: general principles, solid-state rate limiting processes, processes limited by diffusion, reaction on the phase interface, nucleation and growth. The influence of reaction parameters on solid-state process rate. Sintering and recrystallization. Methods of investigation of high-temperature processes. Monoliths, powders, fibers, membranes, thin films and layers. Inorganic composites, inorganic-organic composites, nanocomposites. Thermal, electrical, optical, mechanical and chemical properties of inorganic materials and composites.
Description of instruction methods	Lectures
Description of course/module requirements	Oral exam