Name of the course	**Physics and chemistry of nanostructured surfaces and materials**
Number of instruction hours	20
Outline of course/module content	Quantum-mechanical current. Transmission and reflection coefficients. Some examples of exact calculation of the wave function and energy spectrum. Energy spectra of quantum dots. The basic of the methods for the preparations and characterizations of nanostructures: a) deposition techniques (CVD, LPCVD, MOCVD, ALD, magnetron sputtering, electron beam evaporation, CMOS processing), b) chemical techniques (electrochemical deposition and etching, sol-gel method). Methods for the characterization of nanostructures: Raman spectroscopy, Photoluminescence, absorption, X-ray diffraction, scanning electron microscopy, ellipsometry, electrical measurement. Analysis of surface and interface phenomena. Interface interactions at the level of atoms and/or molecules in nanostructured materials. Nanoobjects and surface modification of nanoobjects. Modification of polymer surfaces in relation to the changes of surface and interface properties and the material as a whole. Inermolecular interaction and molecular recognitions. Self-organisation and self-assembly. Properties of organic nanomaterials - selected examples.
Description of instruction methods	Lectures and seminar. In addition to the theoretical learning of the methods for the preparation and characterization of nanostructures, the experimental teaching would be also conducted in the laboratory on the existing experimental equipment (LPCVD, magnetron sputtering, electron beam evaporation, electrochemical deposition and etching, sol-gel method: Raman spectroscopy, Photoluminescence, X-ray difraction, scanning electron microscopy, ellipsometry, electrical measurement).
Description of course/module requirements	Seminar and oral exam