|  |  |  |
| --- | --- | --- |
| **Study program:** Doctoral academic studies **-** Chemistry | | |
| **Course title:** Chemistry of Surface Processes (H345C) | | |
| **Name of lecturer/lecturers:** Aleksandra R. Zarubica, Marjan S. Ranđelović | | |
| **Type of course:** elective | | |
| **Number of ECTS allocated:** 10 | | |
| **Course objectives**  Acquiring the highest level of chemical and physical-chemical knowledge about surface processes on solid phase  systems, and the ability to use knowledge in setting/solving specific problems, projects and issues related to surface processes - catalytic approach and/or adsorption phenomena. | | |
| **Course outcomes**  The student is trained to: professionally plan and prepare work on a suitable topic from the chemistry of surface processes and harmonize it with the principles of sustainable development; establish appropriate dependences of selected material parameters/properties (texture, structure, morphology) with realized effects in test processes; considers physical-chemical, thermodynamic and kinetic parameters of surface processes (adsorption and/or catalysis); independently performs the necessary analysis (theoretical-mathematical or software approach), and establishes optimized process parameters. | | |
| **SYLLABUS**  *Lectures*  Chemistry of surface states. Adsorption on the surface of stoichiometric and non-stoichiometric oxides. Adsorption on the surface of stoichiometric and non-stoichiometric sulfides. Catalysis on the surface of stoichiometric and non-stoichiometric oxides. Catalysis on the surface of stoichiometric and non-stoichiometric sulfides. Active centers of adsorption and/or catalysis - surface phenomena. Types of surface reactions/processes. Chemical characterization at the volume level. Chemical characterization of the surface. Characterization of crystalline and amorphous structures of materials. Crystal lattice defects. Characterization/analysis of impurities/dopants in crystal lattices. Analysis/characterization of material architecture. Distribution of crystalline phases in materials. Application and consequences of surface processes - perspectives and trends. | | |
| **References**  1. H. S. Nalwa (ed.): Nanostructured Materials - Nanotechnology, Academic, California, 2002.  2. M. Koehler, W. Fritzsche: Nanotechnology, Wiley, New York, 2004.  3. S. Mahajan, K. S. Sree Harsha: Principles of Growth and Processing of Semiconductors, McGraw-Hill, New York, 1999.  4. M. D. Stewart, C. G. Willson, Encyclopedia of Materials: Science and Technology, Elsevier, Amsterdam, 2001.  5. G. Bošković, Heterogena kataliza – u teoriji i praksi, Tehnološki fakultet, Univerzitet u Novom Sadu, Novi Sad, 2007.  6. Serija elektronskih nastavnih materijala razvijenih u okviru ERASMUS+ NETCHEM projekta (<http://mdl.netchem.ac.rs/course/view.php?id=8>). | | |
| **Active teaching classes** | **Lectures:** 105 | **Laboratory work:** / |
| **Teaching mode:** mentorship, interactive teaching, scientific-research work, seminar | | |
| **ASSESSMENT METHODS AND CRITERIA (Max 100 points)** | | |
| written exam - 50 points; oral exam - 50 points | | |