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| **Study program** Undergraduate Studies |
| **Course title** Chemistry of transition metals with coordination chemistry (H118C) |
| **Name of lecturer/lecturers**  Nenad Krstić |
| **Type of course** Obligatory |
| **Number of ECTS allocated 6** |
| **Course objectives** Learning of new and expansion of existing knowledge in the field of transition metal chemistry and coordination chemistry. Getting to know the physico-chemical basics of processes and reactions in which transition metals take part building coordination compounds. Getting to know the basics of spectroscopic characterization of the studied compounds, as well as their applications. Acquiring the necessary knowledge to understand the facts, principles and theory for more detailed study of chemical disciplines in other courses in later years of study.  |
| **Course outcomes**. After successful completion of this course, the student is able to:- understands terms from coordination chemistry (central metal, ligand, coordination sphere, etc.), then the basis of the physical and chemical processes involved in the transition during formation complex compounds, as well as the origin of their color.- understands the physical and chemical basics of the application of coordination compounds of transition metals in technology, analysts (as reagents, for the production of new materials and catalysts), medicine (as reagents and the basis of some medicines) and biology. |
| **SYLLABUS***Lectures* Introduction to transition metal chemistry. Symmetry of molecules. Complex compounds. Central atom, ligands, geometric structure. Formation of complex compounds, spectrochemical series of ligands, energy stabilization. Chemical bonding in complex compounds. Complexes with σ, π and δ bonds. Spectral terms. Electronic spectra of transition metal complexes. Reactions of complex compounds. Acid-base properties. Determining the structure. I series transition metal series. Ti, V, Cr, Mn, Fe, Co, Ni, Cu. Sc, Y and La. II and III series transition metals. Zn, Cd and Hg. Catalytic action of complex compounds. Application of coordination compounds*Laboratory work* Determination of molecules and point groups symmetry characteristics. Nomenclature and isomerism. Spectral terms. The color. Determining the structure of complex units. Obtaining and isolating complex compounds. Application of selected complex compounds in science and industry. |
| **References**1. R. S. Nikolić, D. M. Đorđević, N. S. Krstić, Hemija prelaznih metala, PMF Niš, 2019.2. R.S. Nikolić, G.M. Nikolić, D.M. Đorđević, N.S. Krstić, Koordinaciona hemija – Osnovi, Vežbe i Drugi Oblici Nastave, PMF Niš, 20103. N. Milić, Neorganska kompleksna i klasterna jedinjenja, PMF Kragujevac, 1998.4. A. Cotton, G. Wilkinson. Advanced Inorganic Chemistry, John Wiley & Sons, 1976.5. I. Filipović, S. Lipanović, Opća i anorganska kemija II deo, Školska knjiga Zagreb, 1988. |
| **Active teaching classes** | **Lectures 45** | **Laboratory work 15** |
| **Teaching mode** oral presentation method, interactive teaching, laboratory exercises, panel discussion |
| **ASSESSMENT METHODS AND CRITERIA (Max 100 points)** |
| **Pre exam duties** | **Points** | **Final exam**  | **Points** |
| Activity during lectures | 5 | Written examination | / |
| Practical teaching | 5 | Oral examination | 30 |
| Colloquiums | 60 |  |  |