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| **Study program** Chemistry | | | | |
| **Course title** General chemistry | | | | |
| **Name of lecturer/lecturers** Nikola D. Nikolić, Maja N. Stanković | | | | |
| **Type of course** Obligatory | | | | |
| **Number of ECTS allocated** 9 | | | | |
| **Course objectives**  Acquiring the necessary knowledge to understand facts, principles and theory for a more detailed study of chemical discipline in other courses in the later years of study and the ability to solve quantitative  chemical problems. Getting to know the structure of atoms, chemical bonds, chemical reactions, behavior of solutions, types of inorganic compounds and their systematization, as well as basic concepts from the field  nomenclature, thermochemistry, kinetics and electrochemistry. | | | | |
| **Course outcomes**  Upon successful completion of this course, the student is able to:  - take the following chemistry courses,  - connects the chemical properties of elements and the structure of atoms, as well as the properties of compounds with the type of interactions between them of atoms in the molecule and the type of bond,  - performs experiments in order to acquire new and check and confirm existing knowledge,  - compare chemical changes in everyday life with laboratory reactions and explain their essence | | | | |
| **SYLLABUS**  *Lectures*  Natural sciences and chemistry. International System of Units. Fundamental constants. Quantum mechanics and structure of atoms. Quantum numbers. Atomic orbitals. Quantum levels, Hund's rule and Pauli's principle. Electronic configuration of atoms. Magnetic properties of atoms and ions. Periodic table of elements. Periodicity of physicochemical properties of elements. Atomic radius. Ionization potential. Electron affinity. Ionic radius.  Thermochemistry. Chemical bond. Ionic bond and properties of ionic compounds. Valence and oxidation number. Covalent bonding and properties of covalent compounds. Electronegativity. Transition between ionic and covalent bonds. The Lewises structures and formal charge. Partial charging. Molecular geometry. Dipole moments.  Basics of theory valence bonds. Hybridization of atomic orbitals. Resonance. Quantum mechanics and the structure of molecules. Molecular orbitals of homonuclear and heteronuclear diatomic molecules. Delocalized molecular  orbitals. Intermolecular attractive forces. Metal connection. Aggregate states of matter. Solvents, solutions, theories  acids and bases, chemistry of anions. Reactions in aqueous solutions. Colligative properties, colloids, diffusion and osmosis. Chemical reactions. Redox balance. Electrode potential. Electrolysis. Potential diagrams. Pen  kinetics and chemical equilibrium. Complex compounds: structure and nomenclature. Isomerism. Connection theories in complexes. The influence of the electronic configuration on the magnetic and optical properties of the complex. Stereochemistry of the complex. Nuclear chemistry.  *Laboratory work*  Basic stoichiometric calculations. (mol, molar mass, molar volume). Getting to know the general rules  work and safety measures in the chemical laboratory. Familiarization with chemical utensils and accessories. Procedures for separation and purification of substances. The structure of the atom. Quantum numbers. Atomic orbitals. Basic thermochemical calculations. Thermal effect of dissolution of solid substances. Chemical bond (hybridization, resonance). Solutions (making solutions, diluting solutions, colligative properties of solutions, reactions in aqueous solutions - hydrolysis). Types of inorganic reactions. Acid-base reactions. Redox reactions.  Determination of coefficients in redox reactions. Chemical kinetics and chemical equilibrium. | | | | |
| **References**  1. I. Filipović, S. Lipanović, Opća i anorganska kemija I deo. Školska knjiga, Zagreb, 1996.  2. S. R. Trifunović, T. Sabo, Z. Todorović, Opšta hemija. Hemijski fakultet, Beograd, 2014.  3. R. Chang, Chemistry, 6th edition. WCB-McGraw-Hill, 1998. | | | | |
| **Active teaching classes** | **Lectures** 75 | | **Laboratory work** 60 | |
| **Teaching mode** lectures, homework, theoretical exercises, laboratory exercises | | | | |
| **ASSESSMENT METHODS AND CRITERIA (Max 100 points)** | | | | |
| **Pre exam duties** | **Points** | **Final exam** | | **Points** |
| Activity during lectures | 5 | Written examination | | 30 |
| Practical teaching | 15 | Oral examination | |  |
| Teaching colloquia | 50 |  | |  |
| Seminar |  |  | |  |