TECHNICAL UNIVERSITY OF SOFIA
FACULTY OF INDUSTRIAL TECHNOLOGY

S Y L L A B U S

CHEMISTRY

SPECIALTY: SMART SYSTEMS AND ARTIFICIAL INTELLIGENCE, BACHELAR's DEGREE

For discipline: Physics/**Chemistry**

1. Quantum mechanical model view of the atom structure. Quantum numbers and electron configurations.
2. Periodic table and Mendeleev's law. Periodic trends in physical and chemical properties. Ionization energy, electron affinity and electronegativity.
3. Chemical bonding. Covalent and Ionic bonding. Characteristics. Hydrogen bond. Intermolecular bonding.
4. Method of molecular orbitals. Band theory for solids – metals, semiconductors, dielectric materials.
5. Metallic bonding. Chemical properties of metals.
6. High molecular compounds. Method of their synthesis. Basic physico-mechanical properties of polymerization and polycondensation materials.
7. Polymers and rubbers. Physical-mechanical properties.
8. Ionization theory. Properties of acids bases and salts. Strong and weak electrolytes. Ionization of water. The pH scale.
9. Electrochemistry. Redox processes. Electrochemical cell. Voltaic (galvanic cell). Electrode potential. Electromotive force.
10. Chemical energy as a source of electrical power. Batteries. Lead accumulator.
11. Electrolytic cell. Electrolysis. Faraday's law. Applications of electrolysis. Electroplating.
12. Corrosion. Classification of corrosion. Mechanism of electrochemical (galvanic corrosion). Factors, influencing the process of corrosion.
13. Corrosion prevention. Electrochemical protection. Inhibitors.
14. Metal coating prevention. Anodic and cathodic coating – mechanism of the protective acting. Copper and nickel multilayer coatings.

REFERENCES

1. General Chemistry, Darrel D. Ebbing, Steven D. Gammon, 9th edition, Houghton Mifflin Company, 2009.
2. Chemistry, The Central Science 13th edition - T. Brown, H. Eugene Le May, B. Bursten, C. Murphy, M.Stolzfus; Academic Press, 2014.
3. Advanced Chemistry. Part 1 - Physical and Industrial; Part 2 - Organic and Inorganic, Matthews P., Cambridge Univ. Press (UK) 1999.
4. Laboratory Manual for Principles of General Chemistry, J.A.Beran, 10th edition, John Wiley&Sons,2014.

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