

**SUBJECT: FUNDAMENTALS OF ORGANIC CHEMISTRY**

**NUMBER OF CREDITS: 7**

**YEAR/ SEMESTER: I/1**

**NUMBER OF HOURS/WEEK: 2C + 2L**

**NUMBER OF WEEKS: 14**

**SUBJECT TYPE: Fundamental/Compulsory**

**COURSE OBJECTIVES:** Provide students with a basic understanding of the structure of organic compounds, electronic and quantum theories of chemical bonds, isomerism, electronic effects, speed of reactions, the natural state, the obtaining and the reactivity of hydrocarbons.

**CONTENT:**

**Structure of organic compounds:** Representation formulas of organic molecules. Electronic theory of chemical bonds. Hydrogen bonds.

**Electronics and quantum theories of chemical bonds in organic compounds:** Quantum theory of chemical bonds. Molecular orbital method. Resonance method.  $sp^3$ ,  $sp^2$  and  $sp$  hybridization.

**Isomerism of organic compounds:** Constitutional isomers: chain, position, function, and valence. Stereoisomerism: geometrical isomers. Stereoisomers: conformation isomers of butane. Stereoisomerism: conformation isomers of cyclohexane. Stereoisomerism: symmetry elements of molecules. Stereoisomers: enantiomers, nomenclature of enantiomers. Stereoisomers: diastereoisomers, meso forms, axial and planar chirality.

**Electronic and steric effects in organic molecules:** Inductive effect. Electromeric effect: static and dynamic. Influence of electromeric effects on the properties of molecules. Groups of atoms with electromeric and inductive effects (-I,-E), (-I, + E), (+ I, + E). Hyperconjugation, steric effects.

**Spectroscopic methods in organic chemistry:** UV-VIS electronic spectroscopy. IR absorption spectroscopy. NMR spectroscopy. Mass spectroscopy.

**Reactants, intermediates and reaction types in organic chemistry.** Types of reagents. Carbocations. Carbanions. Radicals. Carbenes.

**Rate of reaction:** transition state theory and the theory of molecular collisions. Organic reactions of order I. Organic reactions of order II Competing organic reactions. Parallel organic reactions. Catalysts. Isotope effects.

**Hydrocarbons:** Alkanes (paraffins). Cycloalkanes (cycloparaffins). Alkenes. Dienes and polyenes. Alkyne (acetylene). Aromatic hydrocarbons.

**BIBLIOGRAPHY**

1. G. Brătulescu, Bazele chimiei organice, Ed. Universitaria, Craiova, 2011.
2. M. Avram, Chimie organică, vol. I, Ed. Zecasin, București, 1994.
3. C.D. Nenițescu, Chimie organică, vol. I, Ed. Didactică și Pedagogică, București, 1980.

**WORKING LANGUAGE:** Romanian

**EVALUATION:** Examination at the end of the course

**EVALUATION MODE:** Written exam