Level: bachelor

Course title: Organic Chemistry III

Status: obligatory

ECTS: 8

Requirements: none

Learning objectives

Providing the necessary methodological basis (theoretical and practical) in the field of stereochemistry as the basis for further understanding and application in other fields of chemistry. Acquiring broad knowledge of a balanced three-dimensional structure of different classes of organic compounds, and the effects of spatial structures of molecules on the chemical and physical properties. Training for solving practical problems in organic stereochemistry. Training for the interpretation of the structure of organic compounds on the basis of NMR spectra.

Learning outcomes

Demonstrate systematic understanding and knowledge of the three-dimensional structure of organic molecules, their conformational forms. Ability to apply knowledge of the 3D structure of organic molecules in the interpretation of physical and chemical properties of compounds. Proper use of molecular models for stereo structure of organic molecules, computer programs for drawing and 3D observation of organic compounds. Proper application of the knowledge gained in solving the basic stereochemical problems. Proper application of theoretical knowledge and understanding in dealing with the structure of simple organic compounds. Demonstrate ability to perform theoretical and experimental work independently or in a team.

Syllabus

Theoretical instruction

Ways for presentation of organic molecules. The study of the conformation of saturated and unsaturated acyclic and cyclic organic molecules. Chirality and stereoisomerism of organic molecules that occurs as a consequence of the presence of one or more stereogenic centre in the molecule. Physical characteristics of chiral compounds. Types of chiral compounds. Determination of the absolute and relative configuration. Racemic modification – synthesis and resolution. Diastereoisomers - real, torsion and geometrical. Isomers of monosaccharides. The cyclic structure of monosaccharides - Fischer, Mills and Haworth formulas. Conformational analysis of monosaccharides. Symmetry relationships between the constitutional same groups in molecule. Prochirality. Application of proton and 13C NMR spectroscopy to solve the structure of organic compounds.

Practical instruction

Use Cochranes molecular models in the spatial analysis of organic molecules. Computer 3D animation of organic molecules. Synthesis of selected racemic mixture. Synthesis of monosaccharides. Assignment of proton and 13C NMR spectra.

Weekly teaching load				Other:
Lectures: 3	Exercises: 3	Other forms of teaching:	Student research:	