Universitat Autònoma de Barcelona

2018/2019

Basic General Chemistry

Code: 100890
ECTS Credits: 6

Degree	Type	Year	Semester
2500252 Biochemistry	FB	1	1

Contact

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Use of languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Prerequisites

Although there are no official prerequisites, it is advisable for the student to review the general concepts of chemistry and biochemistry acquired in the baccalaureate.

Objectives and Contextualisation

The general objective of the proposed program consists in the initiation of chemistry of molecules with an overview of the basic concepts. In this way, it is intended that the student acquires notions about atomic structure and covalent bonding and that he/she begins in the field of the molecular structure. This subject is understood as the basis to be able to develop the study of biomolecules in subsequent subjects.

Main objectives of the subject:

1. To introduce the basic concepts of atomic structure and bonding
2. To familiarize students with the nomenclature and structure of organic compounds based on functional groups
3. To introduce the basic concepts of conformational analysis and stereochemistry of organic molecules

Content

1. Atomic structure. Introduction. Atomic electronic structure. Electronic configuration Periodic table of chemical elements.

2. Chemical bonding I. Introduction. Types of bonding. The octet rule. Lewis structures, formal charges, resonance. Bond order. Polarity. Lewis acidity and basicity. Acid-base equilibria. Nucleophilicity and electrophilicity. Coordination compounds.

3. Chemical bonding II. Valence bond theory. Simple and multiple carbon bonds: hybridization and geometry. Molecular Orbital theory. Aromaticity: electronic structure of benzene. Intermolecular forces: hydrogen bonds.

4. Introduction to organic compounds. Structures and formulas of organic molecules. Nomenclature. Main functional groups in organic compounds: chemical characteristics. Redox equilibria. Structural and constitutional isomerism, stereoisomery. Characterization of organic compounds.

5. Conformational analysis. Concept of conformation. Representation of conformations: Newman's projection and sawhorse projection. Acyclic systems. Conformational equilibria. Cyclic systems. Importance of conformation in biochemical systems.

6. Stereochemistry of organic compounds I. Geometric isomerism in double carbon-carbon bonds: cis-trans or Z-E isomers. Symmetry of organic molecules: Chiral molecules. Optical activity. Stereogenic centers. R / S configuration. Optical isomerism: enantiomers and diastereomers.

7. Stereochemistry of organic compounds II. Fisher and Haworth projections. Resolution: separation of enantiomers. Meso molecules. Concept of prochirality. Tetragonal prochirality: homotopic, enantiotopic and diastereotopic groups. Trigonal prochirality: re / si system. Stereochemistry in organic reactions. Chiral substances in nature.