Universidad Zaragoza

Academic Year/course: 2024/25

27209 - Organic Chemistry I

Syllabus Information

Academic year: 2024/25
Subject: 27209 - Organic Chemistry I
Faculty / School: 100 - Facultad de Ciencias
Degree: 452 - Degree in Chemistry
ECTS: 9.0
Year: 2
Semester: Annual
Subject type: Compulsory
Module:

1. General information

The subject Organic Chemistry is included in the fundamental module and is divided between the subjects Organic Chemistry I and II.

Organic Chemistry I is closely related to a part of the subject Chemistry Laboratory, also from second year. The learning results of Organic Chemistry I are basic for the understanding of other subjects of the fundamental and advanced modules, such as Biochemistry, Materials Science, Structural Determination, as well as for the realization of Degree Final Projects or elective subjects related to synthesis, reactivity and structure of organic compounds. It is advisable to have a good knowledge of General Chemistry, and, in particular, of nomenclature and structure of organic compounds, resonant forms, intermolecular forces and stereochemistry.

2. Learning results

- To understand the structure, properties and reactivity of the main families of organic compounds.
- To infer the structure-properties-reactivity relationship of the main families of organic compounds.
- To apply the most important reaction mechanisms in organic chemistry to explain specific transformations between organic compounds.
- To predict the reactivity of a compound based on its functional group, structure and substituents.
- To predict the outcome of a reaction, given the reactants and reaction conditions.
- To analyse the stereochemical implications of some organic reactions.
- To propose synthetic routes for a given compound from simpler ones using retrosynthetic analysis at a basic level.
- To solve synthetic problems involving sequences of reactions.

3. Syllabus

1. ALKANES AND CYCLOALKANES. Radical halogenation reactions.

2. HALOALCANS. Nucleophilic substitution and elimination reactions, organometallic reagents, introduction to retrosynthetic analysis.

3. ALKENES AND ALKYNES. Electrophilic addition reactions, addition polymers.

4. ALCOHOLS AND ETHERS. Oxidation reactions, nucleophilic substitution and elimination reactions, transpositions of carbocations, epoxide opening reactions.

5. AMINES AND OTHER NITROGEN DERIVATIVES. Ammonium salts, diazonium salts, azo compounds.

6. P-DESLOCALIZED SYSTEMS. Allylic derivatives, conjugated polyenes, Diels-Alder reaction as an introduction to pericyclic reactions.

7. BENZENE AND OTHER AROMATIC COMPOUNDS. Aromatic electrophilic substitution reactions.

8. ARENES, ARYL HALIDES AND PHENOLS. Influence of the benzene ring on the reactivity of substituents, aromatic nucleophilic substitution reactions.

9. ALDEHYDES AND KETONES. Nucleophilic addition reactions.

10. CARBOXYLIC ACIDS AND THEIR DERIVATIVES. Nucleophilic substitution reactions in acyl.

4. Academic activities

Theory classes (6 ECTS). This activity comprises 60 hours of master class, including power point slides and blackboard explanations. This activity can be completed in individual tutoring sessions or in small groups.

Practical classes of problems (3 ECTS). This activity comprises 30 hours of class time dedicated to problem solving, generally on the blackboard. Students should be familiar with the exercises in advance. The issues raised will be shared for discussion in the classroom and may be completed in tutorial classes both individually and in small groups.

5. Assessment system

The student must demonstrate that they has achieved the expected learning results through the following assessment activities

- Progressive evaluation of learning by solving problems or theoretical-practical questions **(GRADE C)**.

For this grade to be taken into account, it will be necessary to take part in 75% of the activities planned during the term.

- Midterm exam consisting of the resolution of theoretical and practical problems or exercises (**GRADE P**) of the subject of the first four-month period. This exam does not eliminate topics.

- Final exam of all the topics of the syllabus consisting of the resolution of theoretical and practical problems or exercises (**GRADE F**).

The use of molecular models will be allowed.

The final grade **(CF)** of the subject will be the best grade obtained by applying formula 1 or formula 2.

*Formula 1****** **CF = 0.2 C + 0.3 P + 0.5 F**

*****A minimum grade of 4 on the final exam is required to apply this formula.

Formula 2 **CF = F**

6. Sustainable Development Goals

4 - Quality Education
9 - Industry, Innovation and Infrastructure
12 - Responsible Production and Consumption