UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Organic Chemistry for Materials

2425-1-ESM01Q003

Aims

The teaching of Organic Chemistry is organized in the first two years of the degree course between this course, in the first year, and the course of the Laboratory of Organic Chemistry, in the second year. The overall objective of the two courses is to provide the student with the theoretical and practical bases of Organic Chemistry necessary to face the subsequent study of organic and hybrid materials.

Knowledge and understanding

At the end of the course the student knows:

- The main concepts related to the study of organic chemistry

- The main classes of organic substances (see list in the detailed content)

- The main properties and reactions of the organic substances listed in the detailed content

Applying knowledge and understanding

At the end of the course the student is able to:

- Have the basic knowledge on the organic substances listed in the detailed content

- Apply the main reactions of the organic substances listed in the detailed content

Making judgments

At the end of the course the student is able to:

- Recognize the main structural and chemical properties of the organic substances listed in the detailed content

- Apply the main reactions on the organic substances listed in the detailed content

Communication

Knowing how to describe in a clear and concise way in writing and orally with the language properties the main concepts of organic chemistry and the properties and reactivity of the main organic substances

Lifelong learning skills

Be able to deal with the study of other classes of organic substances and apply the study to the main classes of organic and hybrid materials, therefore also in different contexts from those presented during the course. Being able to extend knowledge independently through the study and analysis of advanced texts in Organic Chemistry and Organic Materials, in the scientific literature, patents and scientific-technical reports.

Contents

Basic concepts and description of main organic families.

Detailed program

1) References of general chemistry. The electronic structure and the covalent bond. 2) Acids and bases. 3) Introduction to organic compounds. 4) Isomers and arrangement of atoms in space. 5) Alkenes. 6) Reactions of alkenes and alkynes. 7) Delocalized electrons and their effects on stability, reactivity and pKa. Aromaticity - Reactions of benzene and substituted benzenes. 8) Reactions of substitution and elimination of alkyl halides.

Prerequisites

General and inorganic chemistry (1st year)

Teaching form

a) Lecture-Based Teaching: 34 hours
Interactive Teaching: 8 hours

b) Type: lectures and exercises

c) Number of hours delivered remotely (synchronous, without recording): 12 hours (goal: to reach a larger number of students in the presence of lectures with communications and content of particular interest to all students; can also be delivered in the afternoon-evening to better achieve the goal)

Textbook and teaching resource

P. Y. Bruice, "Elementi di Chimica Organica", Edises
A. Abbotto, N. Manfredi, O. Bettucci, "Chimica organica", Scienza Express, 2025

Semester

First year, second (spring) semester

Assessment method

The exam consists of a written test + an optional oral test. The oral test may be requested by the student or the professor. The oral test can improve or lower the grade of the written test, including leading to an overall failure of the exam.

Each exam session is unique and consists of a written test + an (optional) oral test. Under no circumstances should the two tests be considered independent or transferable between different sessions. The written test is valid only for the oral test of the same session.

In some cases, the same session may have two close dates (e.g. in the same month) to offer greater flexibility to students. In such cases, students may participate only once per session. The number of sessions during the year is determined by the Degree Course Council (CCD).

To access the optional oral test, students must achieve a minimum grade of 18/30 on the written test.

Registrations for written and oral tests must be done through the online platform. Registration for the tests is mandatory. Students who are not registered will not be admitted to the exams.

The oral test may include written components (on a board or paper) in front of the examination committee to assess the student's ability to explain in writing the topics covered during the lectures.

The exam aims to assess: the level of knowledge acquired; the student's analytical and judgment autonomy; their presentation skills; and the accuracy and clarity in presenting and describing concepts and knowledge.

Office hours

All days from Monday to Friday upon e-mail request

Sustainable Development Goals

QUALITY EDUCATION