UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Organic Chemistry for Materials

2627-1-ESM02Q003

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 skills

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

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

14 two-hour, in person, Delivered Didactics
8 two-hour practical classes, in person, Interactive Teaching

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

ASSESSMENT OF LECTURED ACTIVITIES

Written exam consisting of exercises and open-ended questions on the topics covered in class
Oral exam consisting of a discussion of the written exam and the topics covered in class

The oral exam may include written sections (on the blackboard or on paper) in front of the examining committee to assess the student's ability and knowledge to present the topics covered in class in writing.

The exam is designed to assess: the level of knowledge acquired; independent analysis and judgment; the student's presentation skills; and the correctness and clarity of the presentation and description of concepts and knowledge.

Intervals of evaluation:

18-19: the student is prepared on a small number of program topics, their dissertation and analysis abilities are limited and only emerge after questioning and help from the examiner; their ability to expose and lexicon used is not always correct, and they lack critical thinking;
20-23: the student is prepared on a fair number of program topics, their dissertation and analysis abilities are limited; they use a correct but inaccurate lexicon, and they are hesitant during exposition;
24-27: the student is prepared on a good number of program topics, they are autonomous during discussion and show critical thinking abilities; they are capable to apply knowledge to real cases, and make use of correct lexicon;
28 – 30/30L: the student preparation on program topics is complete and exhaustive, their are capable of fully autonomous dissertation and critical thinking, they display full fluency and well-structured lexicon.

Office hours

All days from Monday to Friday upon e-mail request

Sustainable Development Goals

QUALITY EDUCATION