UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Organic Chemistry III

2425-3-E2702Q101-E2702Q102M

Aims

1.Knowledge and understanding

At the end of the course the student will have advanced knowledge on the structure and reactivity of organic compounds.

2.Applying knowledge and understanding

At the end of the course the student will be able to apply the acquired knowledge by analyzing different structures / reactions and describing their characteristics and trends.

3.Making judgements

The student must be able to process what he has learned and be able to recognize the situations and problems that may arise during the design and implementation of certain reactions, and be able to suggest changes aimed at modifying the course of the reactions.

4.Communication skills

The student must be able to describe the topics in a clear and concise way and with properties of language and mastery of chemical structures

5.Learning skills

Being able to apply the acquired knowledge to contexts / products different from those presented during the course.

Contents

The course is divided into the following parts.
Basic concepts of stereochemistry, and conformational, steric and electronic effects.
Description of the reaction mechanism.
Nucleophilic substitution reactions.
Addition and elimination reactions.
Carbanions and other carbon nucleophiles.

Detailed program

1) Basic concepts of stereochemistry:
- enantiomeric relationships,
- diastereoisomeric relationships,
- dynamic processes and prochiral relationships.
2) Conformational, steric and electronic effects:
-conformations of acyclic and cyclic molecules,
- stereoelectronic and conformational effects
3) Description of the reaction mechanism:
- use of kinetic and thermodynamic data;
- Hammond postulate;
- principle of Curtin Hammet;
-isotopic effect;
- solvent effect;
- Lewis acid / base catalysis.
4) Nucleophilic substitution reactions:
- limit cases SN1 and SN2
- borderline mechanisms and competing reactions
- solvent effect / leaving group / steric effects.
5) Addition and elimination reactions
- addition of H?O, halogens, electrophiles
- mechanisms E2, E1, E1cb
-stereochemistry of elimination
6) Carbanions and other carbon nucleophiles
- notes on organometallic compounds, enols/enolates, enamines.

Prerequisites

Basic organic chemistry knowledge

Teaching form

21 two-hour lectures, in person, Delivered Didactics

Textbook and teaching resource

Recommended textbooks
Francis Carey and Richard J. Sundberg

Title: Advanced Organic Chemistry, Part A: Structure and Mechanism.

Plenum publishing Corporation

Handouts, scientific articles provided via e-learning platform

Semester

first semester

Assessment method

Written test only, with optional oral (on request of the student or the teacher)

The questions proposed in the exam are aimed at evaluating the knowledge acquired during the course both theoretically, through open questions, and practically, through the proposed exercises. In the answer to the questions the student's scientific and technical language will also be evaluated.
Composition of the vote: The final evaluation will be an average between the evaluation of the frontal module of organic chemistry III course and the organic chemistry laboratory III course.
Grading of grade
18-19: preparation on a small number of topics in the course program, with limited discussion and analysis skills; expository skills and vocabulary not always correct, with limited critical processing skills;
20-23: preparation on a part of the topics in the course program, independent analysis skills only on purely practical and executive issues, use of correct vocabulary even if not entirely accurate and clear and a sometimes uncertain descriptive ability;
24-27: preparation on a large number of topics in the course program, ability to independently carry out argumentation and critical analysis, ability to apply knowledge to contexts and connect themes to concrete cases, use of correct vocabulary and competence in the use of disciplinary language;
28 – 30/30L: complete and exhaustive preparation on the topics in the exam program, personal ability to deal autonomously and critically analyze the topics, ability to reflect and self-reflect and to connect the topics to concrete cases and different contexts, excellent ability to think critically and autonomously, full mastery of the disciplinary vocabulary and a rigorous and articulated expository ability, ability to argue, reflect and self-reflect, ability to connect to other disciplines

Upon request, the exam can be delivered in English.

Office hours

upon request

Sustainable Development Goals