MSE-211

Organic chemistry

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Cursus	Sem.	Type
Materials Science and Engineering	BA3	Obl.

Language of teaching	English
Credits	5
Session	Winter
Semester	Fall
Exam	Written
Workload	150h
Weeks	14
Hours	**5 weekly**
Courses	2 weekly
Exercises	1 weekly
TP	2 weekly
Number of positions	

Summary

This course provides a basic foundation in organic chemistry and polymer chemistry, including chemical nomenclature of organic compounds and polymers, an understanding of chemical structures, chemical reaction mechanisms, as well as methods of organic and polymer synthesis.

Content

Part I: Organic Chemistry
1. The nature of the covalent bond
2. Molecular structure
3. Nomenclature of organic compounds
4. Mechanisms of organic reactions
5. Selected classes of organic compounds

Part II: Macromolecular Chemistry
1. Basics of macromolecular chemistry and polymer science
2. Step-growth polymerizations
3. Chain-growth polymerizations
4. Living and controlled polymerizations
5. Selected classes of polymers

Keywords

covalent bond, organic compounds, nomenclature, isomerism, substitution reactions, addition reactions, elimination reactions, molecular weight, thermoplasts, elastomers, fibers, polycondensation reactions, polyaddition reactions, chain polymerization reactions, living polymerizations, polyolefins, polymethacrylates,polyesters, polyamides, polycarbonates, polyurethanes

Learning Prerequisites

Required courses

General Chemistry

Recommended courses

General Chemistry

Important concepts to start the course

A notion of atoms and molecules

A notion of basic thermodynamics

Learning Outcomes

By the end of the course, the student must be able to:

- Describe the formation of covalent bonds, molecular structures (organic compounds, polymers)
- Draw molecular orbital diagrams, molecular structures (organic compounds, polymers)
- Compare covalent bonds, molecular structures, isomers
- Formulate reactions (organic synthesis, polymers)
- Decide between reaction mechanisms (organic synthesis, polymerisations)
- Derive compound names from molecular structures and vice vera
- Discriminate reaction mechanisms (organic synthesis, polymers)
- Propose polymerization methods

Transversal skills

- Communicate effectively, being understood, including across different languages and cultures.
- Use a work methodology appropriate to the task.

Teaching methods

ex cathedra, slides and blackboard, interactive exercises

Expected student activities

attendance to lectures
active participation in lectures (questions, feedback)
solving the exercise sheets (at home)
active participation in exercises (demonstrating
solutions on blackboard)
complementing course work with organic and polymer
chemistry textbook (at home)

Assessment methods

Written examination

Prerequisite for

All courses related to chemistry and polymer science