MSE-211 Organic chemistry

Frauenrath Holger, Görl Daniel

Cursus	Sem.	Туре	Language of	English
Materials Science and Engineering	BA3	Obl.	teaching	Linglion
			Credits	5
			Session	Winter
			Semester	Fall
			Exam	Written
			Workload	150h
			Weeks	14
			Hours	5 weekly
			Lecture	2 weekly
			Exercises	1 weekly
			Practical	2 weekly
			work	
			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



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

Resources

Moodle Link

• https://go.epfl.ch/MSE-211

Prerequisite for

All courses related to chemistry and polymer science