UE Polymers 1

Niveau d'étude
Bac +4

ECTS
6 crédits

Composante
UFR Physique, Ingénierie, Terre, Environnement, Mécanique (PhITEM), UFR de Chimie et de biologie

Période de l'année
Automne (sept. à dec./janv.)

Diplômes intégrant cet élément

- Master Nanosciences et nanotechnologies

Langue(s) d'enseignement: Anglais

Ouvert aux étudiants en échange: Oui

Code d'export Apogée: YACH7U14

Présentation

Description

Goal : Acquire knowledge concerning the methods of macromolecular synthesis and the characteriza-tion of polymers (structure and average molecular mass). The lecture part is dealing on one hand with the chemistry of polymers, and on the other hand with the study of the physical chemistry of polymers. The discussion section part includes exercises on the following topics in particular: average molecular masses, polycondensation, free-radical polymerization processes and biopolymers. These exercises allow strengthening the knowledge on these topics.

Content:
I. Part "Chemistry of Polymers"
1. Introduction: definitions, brief history, economical aspects, terminology, technical/economical classification, general features of polymers, molecular structure (stereoregularity, tacticity), state domains.
2. Biopolymers

Informations non contractuelles.
Dernière mise à jour le 30 juin 2026

Introduction (conformational aspects).
Outline of the different families of biopolymers (nucleic acids, proteins and peptides, polysaccharides and other biopolymers).
3. Synthetic polymers.
Introduction ; classification of polymerization reactions.
Stepwise polymerization reactions:
General features.
Main reactions used in stepwise polymerization processes.
Kinetic aspects of stepwise polymerizations.
Chain polymerization reactions.
Reaction scheme. Initiation and propagation. Termination.
Kinetic aspects of chain polymerizations.
Polymerization processes. Controlled free-radical polymerization. Insertion polymerizations
4. Synthesis of thermosetting polymers and of elastomers

II. Part "Physical chemistry of Polymers" (11h Lectures – 7.5h Discussion sections):
1. Analysis of the physico-chemical properties in solution:

- Viscosimetry, osmometry
- Light Diffusion
- GPC, thermodynamics and chain dimensions

2. Gels: Polymer gels

Heures d'enseignement

TP	TP	16h
CM	CM	34h

Pré-requis recommandés

Prerequisites: General chemistry (batchelor program)

Période : Semestre 7

Infos pratiques

Lieu(x) ville

Grenoble

Informations non contractuelles.
Dernière mise à jour le 30 juin 2026

Campus

Grenoble - Domaine universitaire

Informations non contractuelles.
Dernière mise à jour le 30 juin 2026