

Module P 102: Physical Chemistry of Polymers

Learning objectives:

The course will provide knowledge about the structure of macromolecules, the thermodynamics of polymer solutions, the molecular characterization of polymers and basics of the properties of polymers in the condensed state (melt and solid state) and of their mechanical properties.

Course units and temporal allocation:

Module P 102 ‚Physical Chemistry of Polymers‘ comprises of the following course units:

	HPW	Semester
Lecture	2	WS
Laboratory Course	6	WS

This module will be offered by lecturers of Physical Chemistry and Macromolecular Chemistry

Course content:

The **lecture** will cover: the spatial structure of single macromolecules (radius of gyration and segment density distribution of a Gaussian coil), thermodynamics of polymer solutions (Flory-Huggins theory, osmotic pressure, phase diagrams), polymer analytics (osmosis, viscosimetry, scattering methods, chromatography, mass spectrometry), macromolecules in the melt and the solid state (glass transition, crystallization), basics of mechanical properties (viscoelastic properties, rubbers, rheology).

The **laboratory course** will provide selected experiments on polymer analytics such as chromatography, mass spectrometry, scattering methods, rheology, optical and electron microscopy.

Entrance requirements:

none

Assessment:

A written (or oral) examination on contents of the lecture and the laboratory course after the first semester amounts to 60% of the final grade. A second grade is given for the laboratory course and amounts to 40% of the final grade. The kind of examination (written or oral) and the date are given at the beginning of the semester.

Work load:

In addition to the 2 HPW for the lecture, 1 hour is planned for individual studies. Additionally, 3 hours are necessary for the preparation of the experiments and the protocol of the 6 HPW laboratory course. Given 15 weeks per semester this adds up to 180 hours. Combined with 30 hours for the preparation of the final examination a work load of 210 hours for the whole semester is calculated.

ECTS Credit points: 7