

Module P 206: Polymer Physics II

Learning objectives:

Introduction to advanced topics in polymer and soft matter physics

Course units and temporal allocation:

Module P 206 ‚Polymer Physics II‘ is comprised of the following units:

	HPW	Semester
Lecture I + Exercises	4	SS
Lecture II + Exercises	4	SS

This module will be offered by lecturers of Theoretical Physics and Experimental Physics

Course contents:

The module consists of

1. one lecture (incl. exercises) with 6 ECTS credit points from the following list:

- **Organic semiconductors**

Electronic structure, charged excitations, neutral excitations, charge transport models, energy transfer models, interfacial dynamics, devices, experimental and theoretical methods

- **Physics of the amorphous state**

Structure of glasses, atomic dynamics, glass transition, stochastic models, polymer specific dynamics, computer simulations, theory of the glass transition

- **Non-equilibrium thermodynamics and statistics**

Systems far from equilibrium, correlation functions and linear response, stochastic processes, Langevin-dynamics, nonlinear dynamics and self organization, generalized potentials, examples

- **Nuclear magnetic resonance and polymers**

Bloch equations, free induction decay and spectrum, diffusion, tomography, field cycling, quantum mechanical treatment, density matrix formalism, local field, coupling, advanced methods

2. one course with 3 ECTS credit points from the following list:

- **Foundations of optical spectroscopy**

basic principles of optical spectroscopy, selected spectroscopic techniques, microscopy, energy transfer (FRET)

- **Practical laboratory course**

Three experiments from the advanced laboratory course of the master program in physics (e.g. photon correlation spectroscopy, organic light emitting diodes, nano-rheology)

- One additional lecture from the list under item 1