



Module P 206: Polymer Physics II

Learning objectives:

In recent years, organic semiconductors have shown great potential in electronic applications like thin-film transistors, light-emitting diodes, and photovoltaic devices, but also in biosensors due to biocompatibility of many of these compounds. In this module, the students will learn how the fundamental electronic structure of neutral and excited organic semiconductors is related to their optical and macroscopic electronic properties that form the basis for advanced applications in optoelectronic devices and transistors. This knowledge is complemented by the discussion of experimental techniques to study these properties.

Course units and temporal allocation:

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

	HPW	Semester
Lecture I	4	SS
Lecture II or lab course	2	SS

This module will be offered by lecturers of Experimental Physics.

Course contents:

1. Organic semiconductors (Lecture I) with 6 ECTS credit points:

This lecture will cover the fundamentals on electronic structure in neutral and excited organic semiconducting materials, as well as the mechanisms of generation, transport and decay of these excitations with special focus on the intrinsic microscopic structure of these materials (structure-property relation). This knowledge will finally form the basis to understand the operational principles of organic optoelectronic devices and transistors.

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

- **Foundations of optical spectroscopy (Lecture II)**

This lecture covers the basic principles of optical spectroscopy and microscopy, selected special spectroscopic techniques, as well as the fundamentals of energy transfer between molecules (FRET).

- **Practical laboratory course**

Three experiments from the advanced laboratory course of the master program in physics (e.g. OLED, TAS, Thin film processing, biomolecular bonding,...).

Entrance requirements:

None

Assessment:

An oral examination on the contents of each lecture or of lecture I and of the practical laboratory course. Lecture I amounts to 2/3 and lecture II or the practical laboratory course amount to 1/3 of the grade.

Work load:

Attending time: 90 hours; pre- and post-preparation: 90 hours; additional time of preparation for examination: 90 hours. Total work load: 270 hours.

ECTS Credit points: 9