



F3E5003 Polymer Mechanics 6.0 credits

Polymermekanik

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for F3E5003 valid from Spring 2014

Grading scale

undefined

Education cycle

Third cycle

Specific prerequisites

Requirements for attending course: basic knowledge about polymer science and engineering.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The students should after completed course understand and be able to analyse the mechanical behaviour of polymeric materials at low strain levels. This include the Boltzmann superposition principle, the time-temperature superposition, the generic time-modulus relationship for amorphous and semi-crystalline polymers, the temperature shift factors for different transitions (main transition and sub-glass transitions). Furthermore, basic knowledge about the molecular interpretation of mechanical relaxation processes should be known by the students.

Course contents

- Phenomenological description of mechanical behaviour of different polymeric materials
- Linear viscoelastic behaviour
- Boltzmann superposition principle and how it is applied to different cases of loading /straining: constant stress, constant strain, constant strain rate and sinusoidal stress/strain.
- Time-temperature superposition applied to different polymeric materials
- The main transition (glass transition): phenomenology and molecular interpretation
- Sub-glass transitions: phenomenology and molecular interpretation
- Semi-crystalline polymers: phenomenology and molecular interpretation

Disposition

Course schedule: 24 h lectures; this course is intended to be held every second year.

Course literature

Polymer dynamics and relaxation, R.H. Boyd and G.D. Smith, Cambridge University Press.

Examination

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

Written examination (6 hp)

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.