



KF2410 Polymer Processing, Advanced Course 6.0 credits

Polymer Processing, fortsättningskurs

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 KF2410 valid from Spring 2011

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Specific prerequisites

Admission requirements for independent students:

75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding. Documented proficiency in English corresponding to English B.

Admission requirements for programme students at KTH:

At least 150 credits from grades 1, 2 and 3 of which at least 110 credits from years 1 and 2, and bachelor's work must be completed, within a programme that includes:

75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding.

Language of instruction

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

Intended learning outcomes

After the course the student should be able to:

- explain the fundamental background sciences to processing of polymeric materials: rheology, heat transfer and solidification processes.
- explain both practical and theoretical fundamentals of injection moulding and extrusion technology, including basic knowledge of the moulding process.
- explain a wider range of polymer processes: thermoforming, compression and transfer moulding, rotational moulding, sintering, blow moulding, assembling techniques.
- use and to interpret data obtained by modern computer-based methods simulating processing.

Course contents

Rheology: Newtons equation, pseudoplasticity, power law behaviour, constitutive parameters relating to materials structure, extensional flow and extensional viscosity, methods to assess rheological quantities.

Heat transfer: conductive, radiative and convective.

Solidification of polymers, crystallisation and glass

formation Injection moulding: basics, flow in the mould, packing in the mould cavity, cooling the melt, heat removal from the mould, mould materials, orientation, shrinkage and other process-related problems.

Extrusion: Basics, solids conveying and hopper design, melting, melt pumping, die design, cooling the plastics outside the extruder.

Basics (overview) of the following methods: thermoforming, compression and transfer moulding, rotational moulding, sintering, blow moulding, assembling techniques.

Exercises: injection moulding, extrusion and film blowing.

Course literature

Gedde, Ulf W. 2002: Fundamentals of polymer science & engineering and polymer processing.

Mikael S. Hedenqvist, Selected papers will be distributed.

Examination

- PRO1 - Project Work, 2.0 credits, grading scale: P, F
- TEN1 - Examination, 4.0 credits, grading scale: A, B, C, D, E, FX, F

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.

Examination (TEN1; 4 credits)

Project work (PRO1; 2 credits)

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.