



# KF2360 Characterization of Polymers and Advanced Products 7.5 credits

## Characterization of Polymers and Advanced Products

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 KF2360 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**

The student should after completed course be able to:

- Predict on qualitative basis the physical structure and the properties of a polymer from its repeating unit and molecular architecture
- Make a selection of relevant analytical techniques for revealing structure and physical behaviour of polymeric materials
- Use (with some practical instruction) in the practical sense physical characterisation methods (thermal analysis, microscopy, scattering, spectroscopy and mechanical methods)
- Analyze (qualitatively, and together with a specialist in a more strict sense) data taken by physical characterization methods (thermal analysis, microscopy, scattering, spectroscopy and mechanical methods)
- Evaluate the function of advanced products and to set up characterization methods that validates the functions

## **Course contents**

General overview of physical characteristics of polymers including the relationship to repeating unit structure and molecular architecture. Structure, phase transitions and properties of wholly amorphous polymers including liquid-like, rubbery (including gels) and glassy states. Structure, phase transitions and properties of semi crystalline polymers. Thermodynamics, structure and properties of polymer blends. The basis and the application on polymeric materials of the following classes of methods: thermal analysis, microscopy, scattering methods, spectroscopy, characterization of surfaces and interfaces and mechanical characterization methods. Application examples from advanced medical products.

## **Course literature**

Polymer Physics, 2nd extended edition, U. W. Gedde and M. S. Hedenqvist, Springer Verlag (abbreviated PP)

Biomaterial Science, An Introduction in Medicin, Eds. D. D. Ratner, A. –S Hoffman, F. J. Schoen and J. E. Lemons, Academic Press. (abbreviated BS)

## Examination

- INL1 - Assignment, 1.0 credits, grading scale: P, F
- LAB1 - Laboratory Work, 1.5 credits, grading scale: P, F
- TEN1 - Examination, 5.0 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.

## Other requirements for final grade

Examination (5 credits)

Laboration (1,5 credits)

Home assignment (1 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.