



KF2495 Polymer Composites - Micro and Nanoscale 7.5 credits

Polymera kompositer - mikro- och nanoskala

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 KF2495 valid from Spring 2019

Grading scale

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

Education cycle

Second cycle

Main field of study

Chemical Science and Engineering

Specific prerequisites

KF2110 Mechanical properties of materials, or equivalent.

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

Admission requirements for independent students:

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

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:

- Describe the basic concepts, methods and principles related to processing, structure and properties of polymer composites.
- Explain the relationships between processing, structure and properties, including experimental aspects and compare the impact of different composites on our environment.
- Compare processing concepts, micro- and nano-structural features, properties, physical and chemical phenomena as well as material compositions from an engineering and/or scientific point of view.
- Predict macro- and micro-scale properties based on information about structural organization and constituent properties.
- Compare quality of knowledge expressed in written solutions to homework problems.
- Compile and analyze the research literature on a given topic, and provide high-quality oral and written presentations of this literature survey.

Course contents

The main focus of the course is related to the following topics: Fibers and polymer matrices, particles (nano to microscale), fiber-matrix interface, nanocomposites and short fiber composites, geometric aspects, processing methods and processing science of conventional and nanocomposites, elastic properties and strength of unidirectional composites, plant fiber composites, moisture effects, structure and properties of nanocomposites as well as case-studies.

Course literature

Hull D, "An introduction to composite materials", Cambridge University Press, 1st ed, 1981

Handouts (particle composites, plant fiber composites, nanocomposites)

Examination

- INL1 - Assignment, 2.0 credits, grading scale: P, F
- LAB1 - Laboratory course, 1.5 credits, grading scale: P, F
- TEN1 - Written exam, 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.

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.