KF2450 Fibre Technology - Natural and Synthetic Fibres 7.5 credits

Fiberteknologi - Naturliga och syntetiska fibrer

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

Establishment

Grading scale

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

Education cycle

Second cycle

Main field of study

Chemical Science and Engineering

Specific prerequisites

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.

Language of instruction

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

Intended learning outcomes

After completing the course the student should
To pass the course be able to:

- Explain which chemical components that are included in the fibre wall, how they are affected by the fiber release processes and what task they have in the fibre wall.
- Explain the importance of unit processes for fibre structure, chemical composition and surface chemical properties of the fibres and how the unit processes can be integrated into a society in a sustainable society
- Relate how the properties of the cellulose fibres (physical and chemical) are related to the fibre network structure and the properties of the fibre materials
- Use selected literature and present a compilation in the form of written report and oral presentation

to get a higher grade than E be able to:

- Explain how fibres interact with water using thermodynamic basic principles and how this affects the properties of fibre based materials.
- Summarize which advanced experimental methods are available to characterize the structure, chemical and surface chemical properties of the fibres.
- Describe how fibres can be modified via chemical and physical methods and how these can be used in existing and new materials.
- Explain how synthetic fibres are manufactured and explain the relationship between chemistry, process and physical properties

Course contents

A basic understanding of how fibers from mainly wood can be liberated from the wood, characterized and modified to be used in such different products as hygiene materials, packaging materials, different paper qualities and an insight into the research front for how fibers can be used in new materials for eg energy storage and advanced composites.

A large focus will be on

- explaining how the hierarchical structure of the fibres is related to the properties of the materials produced by the fibres and the examples given in the course are collected from hygiene materials, packaging materials, paper and composites.
- describing how fibres interact with moisture and water and how this can be described in a basic way and controlled to achieve optimal properties
- giving examples of how fibres can be chemically and physically modified

Examination

- SEM1 - Seminar Task, 1.5 credits, grading scale: P, F
- TEN1 - Written exam, 5.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Work, 1.0 credits, grading scale: P, 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.

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

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.