



KF2180 Biopolymers 7.5 credits

Biopolymerer

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 KF2180 valid from Spring 2019

Grading scale

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

Education cycle

Second cycle

Main field of study

Biotechnology, Chemical Science and Engineering, Chemistry and Chemical Engineering

Specific prerequisites

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 finishing the course the student should be able to:

- Explain and evaluate biopolymer properties based on their structure (at atomic, nano-, micro- and macro-level) and give their chemical structure.
- Relate a specific biopolymer to biological structures in nature.
- Describe the process and explain the material properties and environmental effects of biodegradation.
- Reflect on the polymeric material choices for biomedical applications and pharmaceutical formulations.
- Identify and discuss current environmental issues with a focus on the material's impact in relation to the sustainable development objectives set by the community.
- Suggest and discuss the choice of biopolymers vs. synthetic polymers suitable for common applications with respect to raw materials, energy aspects, material properties, function, environmental impact, waste management, ethical aspects and economy

Course contents

The aim of the course is to provide detailed knowledge of the structure, function, properties and use of biopolymers.

Molecular architecture for some biological structures such as wood, collagen, soft tissue, silk, wool, spider's thread is emphasized.

The concept of nature as a model for polymeric materials is discussed.

Survey and introduction to biomedical materials and "drug delivery" formulations is conducted.

The role of biocomposites is related to biological attacks on polymeric materials and degradation mechanisms in polymeric materials with respect to degradation products in different environments.

The discussion focuses on environmental issues when using biopolymers and synthetic polymers, specifically, various routes for recovery/reuse of plastics.

Course literature

J. Vincent: Structural Biomaterials

M. Elices: Structural Biological Materials

Vetenskapliga artiklar /Scientific articles

Examination

- LAB1 - Project Laboratory Work, 3.0 credits, grading scale: P, F
- TEN2 - Written exam, 4.5 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 4,5 credits.

Project lab (report + seminar) 3 credits

Participation in educational visit.

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.