



# CK2180 Polymer Materials in a Circular Economy 7.5 credits

Polymera material i en cirkulär ekonomi

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

## Establishment

Course syllabus for CK2180 valid from Spring 2025

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Chemical Science and Engineering

## Specific prerequisites

Completed degree project 15 credits, 50 credits in chemistry or chemical engineering, 20 credits in mathematics, numerical analysis and/or data science. English B/6.

## Language of instruction

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

## Intended learning outcomes

After passing the course the student should be able to:

- Describe basic concepts connected to polymer material circularity and reflect over their role in a circular economy.
- Reflect over the sustainability of polymer materials and their contribution to sustainable development.
- Understand how life cycle analysis and sustainability metrics can be utilized in development of sustainable polymer materials
- Perform literature search and investigate theoretically and/or experimentally a topic related to polymers and circular economy. Evaluate and discuss results orally and in a written report

## Course contents

Polymer materials in a circular economy. Biobased, biodegradable and/or recyclable polymer materials.

Principles of different recycling methods. Challenges and possibilities for different recycling methods and material types (e.g. thermoplastics, thermosets, composites, textiles, biodegradables, multicomponent materials).

Design for recycling at molecular, material and product level. Cradle-to-grave and cradle-to-cradle design. Current state and future opportunities.

Biodegradation and role of biodegradable plastics in circular economy.

Polymer materials and sustainability, environmental, social and economic aspects.

Life-cycle analysis and sustainability metrics.

## Examination

- TEN1 - Written exam, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- SEM1 - Seminar, 1.5 credits, grading scale: P, F
- PRO1 - Project Work, 3.0 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.