# CB2100 Environmental Bio-process Technology 7.5 credits

**Miljöbioprocessteknik**

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 CB2100 valid from Autumn 2023

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Biotechnology

## Specific prerequisites

Bachelor's degree in technology or natural sciences containing 20 credits courses in biotechnology, 10 credits courses in mathematics, and 20 credits courses in chemistry. 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 completion of the course, the students should be able to:

- Know and reflect on general concepts in drinking- and wastewater treatment processes, resource recovery and bioremediation for a sustainable future
- Evaluate, compare and calculate the process design of a wastewater treatment process
- Assess different options for bioremediation of polluted environments
- Know and describe common process- and safety concepts in drinking-water treatment technology

## Course contents

This course provides a scientific basis in Environmental Bioprocess Technology from molecular aspects to process design. The course will cover engineering and molecular aspects of water and wastewater treatment processes, resource recovery from waste streams, and the remediation of contaminated land. New technologies using or inspired by biological systems are an important tool for this, and can contribute to the goal of sustainable industrial processes. Traditional processes will be compared with more modern approaches, with a consideration of the economic and environmental impacts of each process. The course will consider long-standing problems such as organic and inorganic pollutants as well as emerging contaminants such as pharmaceuticals and micro-plastics. The course will illustrate examples of processes used in Sweden and the EU, as well as examples from the developing world. This includes four modules:

1. Wastewater treatment, including: eutrophication, removal of nutrients and emerging contaminants (e.g. pharmaceuticals, toxins, micro-plastics) from wastewater.
2. Drinking water treatment, including purification processes, ground water quality, water quality assessment, water quality and health.
3. Strategies for natural remediation of contaminated sites, including bioremediation using bacteria, mycoremediation, phytoremediation and bioaugmentation.
4. Resource recovery from industrial side streams that hitherto were considered as waste, including use of biogas production, recovery of nutrients from water, recovery of polyesters such as PHA and PHB and recovery of volatile fatty acids.

## Examination

- LAB1 - Laboratory work, 1.5 credits, grading scale: P, F
- SEM1 - Seminar, 2.0 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.

The examiner, in consultation with the KTH Disability Coordinator (Funka), decides on any adapted examination for students with documented permanent impairment.

## Other requirements for final grade

In order to pass the exam you need to fulfill the lab course, project and presentation.

## 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.