



# BB2570 System Analysis and Life Cycle Assessment 7.5 credits

## System- och livscykelanalys

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 BB2570 valid from Spring 2020

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Biotechnology

## Specific prerequisites

20 ECTS in biochemistry, microbiology and gene technology/molecular biology; 20 ECTS in chemistry; 20 ECTS in mathematics/numerical analysis/computer science

## Language of instruction

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

## Intended learning outcomes

In order to pass the course, the course participant should be able to:

- Describe and explain fundamental principles of systems thinking, systems analysis and basic life cycle assessment (LCA) methodology (examined through TEN1 and TEN2)
- Identify and explain applicability and limitations of LCA (examined through TEN1 and TEN2)
- Apply basic LCA to evaluate potential life cycle environmental impacts of biotechnological processes (examined through PRO1 and TEN2)
- Identify stakeholders and factors that influence sustainability of processes and use life cycle assessment tools to evaluate and compare different products, services and processes (examined through PRO1)
- Communicate and discuss LCA results and their significance in supporting an ecologically sustainable development (examined through PRO1)
- For higher grades, more credits are required on written exams (TEN1 and TEN2), which are gradually translated into grades A-D.

## Course contents

The course aims to train student's ability to analyse processes within the industrial and academic biotechnology sector, from a holistic perspective. Students will acquire fundamental knowledge regarding system analysis as well as its use to prioritize, rank and select sustainable solutions. Proficiency regarding how to evaluate biotechnological processes from a sustainability perspective will be trained through hands-on use of mathematical and statistical models. During the course students will acquire knowledge on different life cycle assessment methods and how to select appropriate tools to analyse processes for production of biotechnological products and services. A project will be performed to gain understanding of multifaceted aspects influencing systems and the complexity of analysing processes from a system perspective. Life cycle assessment will be performed for production of a given product to evaluate and contrast sustainability of biotechnological and traditional processes. The project will also train students ability to communicate, discuss and argument for assumptions enabling life cycle assessment, obtained results as well as critically assess the outcomes.

## Examination

- PRO1 - Project, 3.5 credits, grading scale: P, F
- TEN1 - Written home 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 examination is based on two written exams and a project work. The project work includes participation in mandatory workshops, seminars and written project report.

Requirement for final grade is approved written examination and approved project.

## **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.