CB2140 Enzymology and Biocatalysis 7.5 credits

Enzymologi och biokatalys

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

Establishment

The official course syllabus is valid from the autumn semester 2026 as decided by the Faculty Board decision PA-2025-0010. Date of decision: 2025-10-01.

Grading scale

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

Education cycle

Second cycle

Main field of study

Biotechnology

Specific prerequisites

A bachelor's degree, corresponding to at least 180 ECTS, including at least 6 ECTS in Biochemistry or Biotechnology, 30 ECTS in Chemistry (preferably organic chemistry, analytical chemistry and physical chemistry), and courses in Mathematics and computer programming to a total of at least 20 ECTS.

Intended learning outcomes

After completing the course, the student should be able to

- utilize and apply knowledge from basic biotechnology and chemistry courses to design environmentally sustainable enzymatic processes for the industrial production of chemical products.
- calculate various enzyme parameters from experimental data using selected kinetic models.
- reflect and discuss how biocatalysis can be applied in industry to create more environmentally sustainable biotechnological and chemical processes and, to reflect on sustainable societal development.

Course contents

The course content provides good theoretical knowledge about environmentally sustainable technical use of enzymes to produce high-value chemicals. It includes both enzymology and applications of enzyme catalysis. The course lectures cover enzyme classification and nomenclature, enzyme kinetics with one or more substrates, transition-state theory, and principles of catalysis and reaction mechanisms. Description of experimental techniques such as using enzymes in an anhydrous environment, utilizing enzyme cascades, and methods for optimizing the stereochemical outcome are other important aspects discussed in the course. Many current industrial biocatalysis processes are discussed as examples. The course also includes current strategies for enzyme engineering and other modification of enzymes for catalytic applications.

The course includes lectures, exercises, and a research project study that is designed, planned, and then executed in the course laboratory. The research projects are presented at seminars at the end of the course.

Examination

- TEN1 - Written exam, 4.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory work, 2.5 credits, grading scale: P, F
- KON1 - Partial exam, 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.

Other requirements for final grade

Attendance at practical sessions is mandatory.

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.