BB2020 Molecular Enzymology 7.5 credits

Molekylär enzymologi

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

Establishment

Course syllabus for BB2020 valid from Autumn 2019

Grading scale

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

Education cycle

Second cycle

Main field of study

Biotechnology

Specific prerequisites

At least 150 credits from grades 1, 2 and 3 of which at least 100 credits from years 1 and 2, and bachelor's work must be completed. The 150 credits should include a minimum of 20 credits within the fields of Mathematics, Numerical Analysis and Computer Sciences, 5 of these must be within the fields of Numerical Analysis and Computer Sciences, 20 credits of Chemistry, possibly including courses in Chemical Measuring Techniques and 20 credits of Biotechnology or Molecular Biology.

Language of instruction

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

Intended learning outcomes

On completion of the course the student should be able to:

- Calculate different enzyme parameters from experimental data using selected models and examine, compare and explain the results (TEN1)

- Summarize research literature about an enzyme in a report regarding its chemical and kinetic mechanism of catalysis and enzyme-substrate interactions (INL1)

- Plan, design and perform laboratory exercises on enzyme catalysis; select a valid model based on experimental data and calculate kinetic parameters using non-linear curve fitting; summarise and discuss the results in a report (LAB1)

- Higher grade (A-D) requires that the student can apply acquired knowledge to compute, explain and evaluate increasingly more complex questions (TEN1)

Course contents

- Enzyme classification and nomenclature
- Enzyme kinetics with single and multiple substrates
- Reversible, irreversible and product inhibition of enzymes
- Enzyme catalysis: transition-state theory and activation energy
- Catalytic principles and chemical mechanisms
- Catalytic amino acids and pH-profiles of enzymes
- Practical methods in enzymology: introduction to practical studies of enzyme kinetics, inhibition, reaction mechanisms, detection of intermediates, active-site titration
- Linear and nonlinear curve fitting of experimental data to kinetic models
- Introduction to computer graphics as a tool to visualize enzyme structures, catalytic amino acids and enzyme-substrate/inhibitor complexes

Examination

- INL1 - Literature Task, 1.5 credits, grading scale: P, F
- TEN1 - Home exam, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laborator Work, 1.5 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

The requirement for a final grade is grade E on the written exam (TEN1) and grade P on the laboratory course (LAB1) and on the literature exercise (INL1).

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.