BB1190 Gene Technology 7.5 credits

Genteknik

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 BB1190 valid from Spring 2015

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

The upper-secondary school from 1 July 2011 and adult education at upper-secondary level from 1 July 2012 (Gy11/Vux12)

Specific entry requirements A9

Specific entry requirements equivalent: Physics 2, Chemistry 1 and Mathematics 4. In each of the subjects are required lowest the grade E.

The upper-secondary school before 1 July 2011 and adult education at upper-secondary level before 1 July 2012

Specific entry requirements 9.

Specific entry requirements equivalent: Mathematics E, physics B and chemistry A. In each of the subjects are required the grade Passed or 3.

Language of instruction

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

Intended learning outcomes

After passed/accomplished course the student should be able to:

• Give an account of the function and field of use of commonly used enzymes in gene technology

• Explain the principle behind different DNA-sequencing methods and discuss their possible strengths and weaknesses

• From a given problem, design an appropriate PCR-attempt, for example cloning of desired gene, and explain the function of the included components

• From a given problem choose in addition appropriate combination of host-vector system and account for its advantages and disadvantages in relation to other possible combinations and describe/explain the different vector components/elements function

• Give example of different physical and genetic strategies for modification/manipulation of gene expression and account for which consequences these may have at the molecular and cellular level

• Describe different mutagenesis -, screening and selection methods that are used, among others, within protein engineering field and prepare strategies where these are applied to solve biotechnical issues

• Describe the principles behind gene technology-based therapeutic strategies, for example modern vaccines and gene therapy, and give examples of their advantages and disadvantages and possible limitations compared with traditional treatment methods

• Give example of methods for transcriptome - and the proteome analysis and explain the underlying principles

• Describe at a general level the methods for generation of transgenic multicellular eukaryotic organisms and their fields of use.

• Present and evaluate laboratory work in the form of a written report

Course contents

Course relevant fields within molecular biology will be repeated and deepened. The tools and the methods that facilitate the molecular biotechnology will be treated. In addition to this different applications of molecular biotechnology will be highlighted. Example of the courses different included parts:

• transcription - and translational regulation

• recombinant DNA (enzymes, vectors, host cells)

• PCR techniques

• DNA-sequencing

• mutagenesis, genetic library

• screening and selection methods

• design of recombinant bioprocesses (promotors, vectors, host cells, gene fusions, etc)

• therapeutic strategies (vaccines, gene therapy, etc)

• DNA-based diagnostics

• genetic linkage analysis

• transgenic organisms

• function genomics

• methods for transcriptome and proteome analysis

• A lab course where many of the theoretically treated technologies are tested practically; among others a strategic mutagenesis will be carried out with subsequent identification, sequence verification, and of categorization of relevant the clone.

Course literature

Biotechnology: Academic Cell Update Edition

Academic Press

David P. Clark, Nanette J. Pazdernik

ISBN: 0123850630, 9780123850638

The reading list is in English and the language of instruction is Swedish.

Examination

• LAB1 - Laboration, 1.5 credits, grading scale: P, F

- TEN1 - Written exam, 6.0 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.

On TEN1, no aids are allowed.

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.