FBB3420 Genetic Engineering 7.0 credits

Genteknik

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

Establishment

Course syllabus for FBB3420 valid from Autumn 2015

Grading scale

G

Education cycle

Third cycle

Specific prerequisites

Civ Ing or Master degree in Biochemistry, Chemical Engineering, Molecular Biology, Biotechnology.

Students that already have completed any of the KTH courses BB1110 or BB1190 can not take this course.

Language of instruction

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

Intended learning outcomes

The course is focused on the most important genetic engineering methods and their underlying molecular biology. The course will give insight into the principles and limitations of modern biotechnology and understanding of what problems biotechnology can solve.

After completion of this course, the student should be able to:

-Describe the function of the most common enzymes used in molecular biology

-Explain the different DNA sequencing methods and when they would be applied

-Given a certain problem, design a molecular biology laboratory experiment or research plan to solve this problem

-Explain which biological hosts are the best choice for producing a certain protein and why.

-Give examples of how to increase or decrease the expression of a given gene using gene regulation mechanisms

-Describe methods for performing DNA mutagenesis and how to screen or select for successful mutants.

-Explain the principles behind modern gene therapy

-Describe how to perform large-scale transcriptomics and proteomics assays

-Translate concepts in genetic engineering to their own research

-Hypothesize how concepts in genetic engineering could be applied in their field of research

Course contents

The course will cover key aspects of molecular biology, with focus on prokaryotic and eukaryotic gene expression. The tools and methods that make molecular biology possible will be explored. Examples of the course lectures include

- Regulation of transcription and translation
- Recombinant DNA
- PCR
- DNA Sequencing
- Mutagenesis and gene libraries
- Screening and selection methods
- Designing new gene expression systems
- Therapeutic applications such as vaccines and gene therapy
- Molecular diagnostics
- Environmental genomics

In addition to assigned problems, students will also write essays that relate concepts in class to their own research. These essays shall be referenced with examples from the literature.

Experimental laborations are included

Disposition

Lectures (18)

Homework problems (3-4)

Written essays (10)

The course is given in English

Course literature

Biotechnology: Academic Cell Update Edition
Academic Press

David P. Clark, Nanette J. Pazdernik
ISBN: 0123850630, 9780123850638

Examination

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

Passed written examination (TEN1; 5.5 hp, at least grade C on the A-F scale)

10 written reflections (1 page each) on how a given concept relates to your research.

Labcourse requirements fulfilled

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.