BB1010 Introduction to Biotechnology 7.5 credits

Inledande bioteknik

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

Establishment

Course syllabus for BB1010 valid from Spring 2019

Grading scale

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

Education cycle

First cycle

Main field of study

Biotechnology, Technology

Specific prerequisites

The upper-secondary school from 1 July 2011 and adult education at upper-secondary level from 1 July 2012 (Gy2011)
Completed upper secondary education including documented proficiency in English corresponding to English course B/ English 6.
Specific entry requirements: Physics 2, Chemistry 1 and Mathematics 4. In each of the subjects the minimum grade required is Pass.

The upper-secondary school before 1 July 2011 and adult education at upper-secondary level before 1 July 2012
Completed upper secondary education including documented proficiency in English corre-

sponding to English course A.
Specific entry requirements: mathematics E, physics B and chemistry A. In each of the subjects the grade required is Passed or 3.

Language of instruction

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

Intended learning outcomes

The course will provide an introduction the basics of biotechnology. The course aims to provide introductory theoretical knowledge in biochemistry, cell biology and an introduction to molecular biological tools within biotechnology. This knowledge will provide a foundation for further studies within the biotechnology program. The course also briefly covers philosophy och science and ethics within biotechnology.

After passing the course, the students should be able to:

- Describe how prokaryota and eukaryota cells are structured, partitioned and their organization
- Describe enzymes' catalytic function and role in metabolism.
- Describe biochemistry's fundamental principles and the structure of the most important molecules.
- Understand the principles of glycolysis, photosynthesis and other metabolic processes.
- Describe DNA replication, transcription and translation in detail.
- Describe the most basic molecular biological methods.
- Describe the heredity structure in prokaryotes and eukaryotes
- Give examples of applications within the genome's function
- Describe on a basic level protein classification and transport in human cells
- Understand and describe how energy metabolism happens in human cells.
- Describe the cell membrane's structure and describe different types of transport mechanisms through the membrane.
- The ethics part of the course aims to provide the students with a basic ethical conception mechanism. The conclusion of this portion of the course will be practical bio-ethical problems, among other things, updates within the rapid development within the area and the students will be trained to implement those ethical tools and reflect on issues.

In addition to the knowledge mentioned above, the course aims to provide knowledge about the following:

A feeling for what subject area biotechnology involves

An idea about the techniques which are used within the industry and research

Course contents

The organization and structure of procaryotic and eukaryotic cells. The chemical components of the living cell. The composition and structure of nucleic acids and their role as carrier of information. The structure, function and biosynthesis of proteins. Introduction to the catalytic function of enzymes and their role in the metabolism. Gene regulation and genetic variation. The tools and applications of DNA technology. An overview of biotechnology in Sweden and its role in industrial applications. During the course, an opportunity will be given to take part in three laboratory exercises and one test exam.

The moment about philosophy of science and ethics comprise rôle-play, lecture and a seminar. All moments are compulsory.

Course literature

The Cell - A Molecular Approach, seventh edition (2016): Cooper and Hausman American Society for Microbiology / Sinauer Associates, Inc.

Handouts. Compendium from the philosophy institution.

Examination

- TENB - Written Exam, 1.5 credits, grading scale: P, F
- TENA - Written Exam, 5.5 credits, grading scale: A, B, C, D, E, FX, F
- LABA - Laboratory Work, 0.5 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

A written examination about the "Biotechnology" element(TEN1; 5,5 credits, grading scale A-F) and a written examination in the element about Ethics (TEN2, 1.5 credits, grading scale Pass/Fail). Mandatory presence in all activites in the ethics element.

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.