



BB2471 Genetics 5.0 credits

Genetik

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

Establishment

Course syllabus for BB2471 valid from Autumn 2016

Grading scale

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

Education cycle

Second cycle

Main field of study

Biotechnology

Specific prerequisites

**Admission requirements for programme students at KTH:

**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.

**Admission requirements for independent students:

**A total of 20 university credits (hp) in life science courses (e.g. biochemistry, microbiology and gene technology/molecular biology). 10 university credits (hp) in mathematics. Documented proficiency in English corresponding to English B.

Language of instruction

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

Intended learning outcomes

Following completion and passing of the course you should be able to describe:

- the architecture and function of the genomes of the different organisms, and explain how differences and similarities have evolved since the origins of life
- how genes function and are inherited in different types of organisms, and how this affects the organisms' function and defence against genetic defects, and their evolution
- how DNA gets damaged and is repaired in the cells, and how genetic variation, resulting from inheritance or from “fresh” DNA damage, affects our health
- how genetic variation, among genes, individuals, populations or species, originates and evolves

Course contents

Genetics is the basis for most biological, medical and biotechnical analyses and techniques. Consequently, in order to optimally exploit the biotechnical tools, knowledge about the basic genetics is of great importance. This course aims to give a broad knowledge, from an evolutionary perspective, of how genetic variation is formed and inherited, and how it evolves.

A number of basic aspects of genetics will be studied, for example:

- The origins of life, and the “Tree of Life”: the origins, development and relationships (phylogeny) of all organisms
- The mechanisms of evolution
- The genetic difference between organisms: differences and similarities in the architecture and function of the genomes, and how this evolved through the evolution
- Inheritance of genes and traits: different modes of inheritance (e.g. Mendelian and asexual) and their effect on the “success” of individuals and species
- Inherited diseases: their causes and effects
- Mutations: the chemistry of DNA damage, the types of mutations, and cellular mechanisms for their repair
- Mapping of genes (identification of which trait is affected by which gene)
- Genetic differences between human populations: their historical origin and subsequent spread, and their medical importance

Course literature

Examination

- TEN1 - Written exam, 5.0 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.

If the course is discontinued, students may request to be examined during the following two academic years.

Account for distributed articles at seminar

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.