



BB2475 Genetics1 7.5 credits

Genetik1

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

Establishment

Course syllabus for BB2475 valid from Autumn 2018

Grading scale

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

Education cycle

Second cycle

Main field of study

Biotechnology

Specific prerequisites

BB1150, BB1160, BB1030

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 the course you should be able to describe:

- The mechanisms of evolution and theories how life may have originated
- The architecture and function of the genomes of the different organisms, and 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” mutations, affects our health
- How genetic variation, among genes, individuals, populations or species, originates and evolves
- How the DNA-based genetic complexity is further amplified by epigenetic inheritance and transcription/translation regulation
- How genetic diversity among humans has evolved and how it affects health and medicine in different populations
- The potentials and problems of exploiting the accumulating genetic data in medicine

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

Epigenetics

Inherited diseases: their causes and effects

Mutations: the chemistry of DNA damage 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

The potentials and limits of the recent improvements in genetic analysis for medicine

Course literature

Fundamental Genetics by John Ringo ,Cambridge University Press 2004

Selected scientific articles

Examination

- SEM1 - Scientific discussion about articles, 1.5 credits, grading scale: P, F
- TEN1 - Examination, 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.

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

Other requirements for final grade

Written exam

Active participation in literature seminars

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.