BB2490 Analysis of Data from High-throughput Molecular Biology Experiments 7.5 credits

Analys av data från storskaliga molekylärbiologiska experiment

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 BB2490 valid from Spring 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 biochemistry, microbiology and gene technology/molecular biology. 30 university credits (hp) chemistry, as well as 20 university credits (hp) in mathematics and computer science as well as bioinformatics 3,5 university credits (hp) and statistics 3,5 university credits (hp) or corresponding. 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

This is an advanced course in bioinformatics. After passing the course, the student should be able to:

- **describe** widely used high-throughput experimental techniques employed to investigate the DNA, RNA, and protein contents of a cell, tissue, or organism
- **explain** the theory of state-of-the-art tools/algorithms for processing data from high-throughput molecular biology experiments.
- **choose** appropriate methods and tools for processing data from high-throughput molecular biology experiments.
- **Use** tools for processing data from high-throughput molecular biology experiments.
- **interpret** the results of the data analyses in a biologically or medical relevant context.
- **reflect** over the choice of methods and tools and how it influences the outcome of the analyses

Course contents

The course contains the fundamental theory of, and the use of, bioinformatics analysis of large data sets from high-throughput genomics and proteomics experiments – in particular, massively parallel DNA sequencing and protein mass spectrometry: how this theory is implemented in state-of-the-art tools for handling, analyzing, and visualizing the data; how these tools are applied on real high-throughput molecular biology data; and how the outcome of the analysis may be interpreted in a biologically or medical relevant context.

The course consists of lectures, student-prepared presentations, computer-based laboratory exercises, and a project.

The course is primarily aimed at students at the Biotechnology Master of Science in Engineering Degree program and the master programmes Medical Biotechnology and Molecular Techniques in Life Science.

Course literature

Scientific articles and web resources as assigned during the course. Handouts from the lectures.

Examination

- LABA - Computer Exercises, 1.5 credits, grading scale: P, F
- PRO1 - Project, 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.

No aids are allowed other than those specified in the course PM.

Other requirements for final grade

The final grade on the course is determined by the grade on the project (PRO1, grade scale A-F). Passed grade also in the LABA. There are parts of the course that has compulsory attendance.

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.