



CORE FACILITIES

SC00027 Bioinformatics in Genomics, 4.5 credits

Bioinformatics in Genomics, 4,5 högskolepoäng

Third-cycle level / Forskarnivå

Confirmation

This syllabus was confirmed by the Council for PhD Education at Sahlgrenska Academy on 2019-01-29, and is valid from Spring semester 2018.

Responsible Department

Core Facilities, Sahlgrenska Academy

Entry requirements

Admitted to postgraduate education.

The course is open for PhD students in need of bioinformatics skills for the analysis of genomic data. To be able to follow the course you need to have a background in genetics, cell biology, biomedicine, biochemistry, bioinformatics or similar.

The course is an elective course within the third cycle at Sahlgrenska Academy.

Learning outcomes

After completing the course the student is expected to be able to:

Knowledge and understanding

- Understand the utility of computer knowledge in the analysis of genomic and high throughput data
- Identify the variety of molecular databases and bioinformatics software
- Outline bioinformatics tools used in sequence analysis
- Describe the different flows in the analysis on NGS data.

Skills and abilities

- Perform queries in the different molecular databases
- Employ the relevant theoretical background on sequence analysis to the students' own research

- Understand the different workflows and formats in the analysis of NGS data
- Use computational software in the analysis of genomic data.

Judgement and approach

- Evaluate and interpret the significance of their own and others' scientific results
- Understand the meaning of the techniques that have been introduced in the course and be able to pick out the methods suitable for their own research.

Course content

The course includes a combination of lectures, group discussions and practical sessions.

The topics covered are:

- Use of molecular biology databases such as NCBI, UCSC and ENSEMBL
- Work on web-based platforms for data intensive biomedical research
- Theory and practice on sequence analysis methods to understand features, functions, structure and evolution of DNA, RNA and peptide sequences. Included are: sequence alignment, profile comparisons, gene prediction and phylogeny.
- Analysis of NGS data, including: Exome-seq, RNA-seq, ChIP-seq, Methyl-seq and Metagenomics.

Types of instruction

Lectures, group discussions and practical sessions.

Language of instruction

The course is given in English.

Grades

The grade Pass (G) or Fail (U) is given in this course.

To receive a passing grade, the PhD student is required to complete all practical sessions and demonstrate that the learning objectives have been reached.

Types of assessment

Assessment will be done through the practical sessions; these are designed to test the understanding of the different applications, so completion of all of them is mandatory. Active participation during group sessions and attendance for at least 80% is also mandatory.

A doctoral student who has failed a test twice has the right to change examiners, if it is possible. A written application should be sent to the Institute.

Course evaluation

The course evaluation will be done through a written questionnaire, available at GUL, where students will be asked to describe their opinions on the various stages of the course for future development. This information will be compiled and shared with students who participated in

the course. Improvements are shared with students participating in the next emission of the course.

Other information

This course can be the basis for the advanced course in data analysis which is given in autumn.

Students are expected to read and be aware of the university's policies re-garding plagiarism. These policies can be found at <http://www.ub.gu.se/skriva/plagiering>. Plagiarism will not be tolerated and suspected cases of plagiarism will be reported to the university disciplinary committee.

Computers access and internet is required since all communication concerning the course and relevant documents, such as lectures exercises and literature will be posted at the virtual learning environment (GUL).

The syllabus was confirmed by the Council for PhD Studies on 2016-09-13 and was last revised on 2017-09-12 to be valid from spring semester 2018 (reg.nr.: U 2017/543). It was entered into FUBAS 2019-01-22.