CORE FACILITIES

UNIVERSITY OF
GOTHENBURG

SC00024   Analysis of next generation sequencing data, 2 credits

Analysis of next generation sequencing data, 2 högskolepoäng

Third-cycle level / Forskarnivå

Confirmation

This syllabus was confirmed by the Council for PhD Education at Sahlgrenska Academy on 2018-12-12, and was last revised on 2020-03-17. The revised course syllabus is valid from Autumn semester 2020.

Responsible Department
Core Facilities, Sahlgrenska Academy

Entry requirements

Admitted to postgraduate education.

To be able to follow the course you should have:

- a background in genetics, cell biology, biomedicine, biochemistry, bioinformatics or similar,
- a research project where you are currently using next generation sequencing or are planning to use next generation sequencing.

You must have experience within linux environment.

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

- Identify the different NGS technologies in the market
- Evaluate the main variables that influence the design of a sequencing project
- Differentiate between a good and a bad data set
- Describe the different workflows in the analysis of NGS data
- Interpret the results from the different NGS applications

- Select the best algorithms and methods for a reliable analysis of NGS data

Competence and skills

- Design a sequencing project, based on project goals, sample type, coverage, time frame, etc
- Use statistical concepts to analyse and interpret the different settings within a sequencing project
- Perform in depth data analysis on the different NGS applications: Exome-seq, RNA-seq
- Modify the common NGS workflows to suit their own research

Judgement and approach

- Assess the settings of a sequencing project
- Select a specific NGS workflow based on the sequencing project design
- Evaluate and interpret the significance of their own and others' scientific results.

Course content

The course includes a combination of lectures and practical sessions and covers:

- Introduction to NGS technologies
- Experimental design
- NGS quality assessment
- SNP analysis in targeted resequencing data
- Structural variants analysis in whole genome sequencing data
- Differential gene expression analysis in RNAseq data
- Downstream analysis such as pathway analysis, clustering and Gene ontology.

Types of instruction

Lectures 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.

For "Pass" the 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 design to test the understanding of the different applications, so completion of all of them is mandatory for a passing grade. Active participation during group sessions and attendance for at least 80% is also mandatory.

If a student, who has been failed on the same examining course component twice, requests a change of examiner before the next examination session, a request of this kind should be sent in

---

writing to the department responsible for the course, and granted, unless there are special reasons to the contrary (Chapter 6, Section 22, Higher Education Ordinance).

Course evaluation

Course evaluation is carried out in writing with the aid of the Sahlgrenska Academy's joint course evaluation, and orally via a dialogue with the students. The teacher responsible for the course compiles and analyzes the course evaluations and makes suggestions for the development of the course. Analyses and suggestions are conveyed to the students and published on the University of Gothenburg's learning platform.

The result and any changes in the set-up of the course shall be communicated both to the students that carried out the evaluation and to the students who are about to start the course.

Other information

Computer access and internet is required since all communication concerning the course and relevant documents, such as lectures, exercise and literature, will be posted at the University of Gothenburg's learning platform.