UNIVERSITY OF SKÖVDE

TRANSLATION FROM SWEDISH

COURSE SYLLABUS

Bioinformatic Workflows for Large-Scale Sequencing Data A1N

7.5 credits

Course code: BI764A
Version number: 2
Valid from: 1 January 2026
Ratified by: Curriculum Committee for Bioscience
Date of ratification: 24 April 2025

1. General information about the course

The course is provided by the University of Skövde and is named Bioinformatic Workflows for Large-Scale Sequencing Data A1N (Bioinformatiska analysflöden för storskaliga sekvenseringsdata A1N). It comprises 7.5 credits and is a second-cycle course. The level of progression is A1N.

The course is a part of the main field of study in Bioinformatics. It can also be a part of the main field of study in Systems Biology and Bioscience. The disciplinary domain of the course is Natural Sciences.

2. Entry requirements

150 approved higher education credits, of which a total of at least 90 credits in one or more of the subjects biology, biomedicine or computer science (or the equivalent). The biological field refers here to programs with a bioinformatics, systems biology, molecular biology or microbiology focus. Of these, at least 15 credits must be at level G2E (or the equivalent). Furthermore, courses of at least 7.5 credits in the subject bioinformatics, 7.5 credits in cell biology and 15 credits in programming (or the equivalent) are required. A further requirement is proof of skills in English equivalent of studies at upper secondary level in Sweden, known as the Swedish course English 6 or English level 2 (or the equivalent) is required. This is normally demonstrated by means of an internationally recognized language test, e.g. IELTS or TOEFL or the equivalent.

3. Course content

The course aims to provide students with theoretical understanding and practical experience of using bioinformatics analysis workflows for analysis of sequencing data. Tools for analysis workflows are explained and combined with exercises where students can apply existing analysis workflows and develop their own. The course also covers version control and its applications in the development of code and analysis workflows. In connection with the application of analysis workflows, students will practically use virtual execution environments to manage software dependencies and achieve reproducibility. Students also gain theoretical understanding of computer clusters and cloud computing, and practical experience of running analysis workflows on remote computing resources.

4. Objectives

After completion of the course, the student shall be able to:

- develop and use bioinformatic analysis workflows to analyze large-scale sequencing data on computer resources with remote access,
- use version control in a qualified manner when developing and executing bioinformatic analysis workflows,
- package, share and utilize virtual execution environments to satisfy dependencies of analysis workflows,
- provide an in-depth account of software for developing bioinformatic analysis workflows, and
- provide an in-depth account of the use of computer clusters and cloud computing to perform computationally intensive analyses of sequencing data.

5. Examination

The course is graded A (Excellent), B (Very good), C (Good), D (Satisfactory), E (Sufficient) or F (Fail).

The grade for the entire course is only issued when all examination components have been passed and is determined by a weighted average of the grades for the assignment, seminar and written exam. The average is rounded to the nearest integer (half is rounded up) and translated into a grade for the entire course.

The examinations of the course consist of the following modes of assessment:

- **Assignment**
  3 credits, grades: A/B/C/D/E/F
- **Seminar**
  3 credits, grades: A/B/C/D/E/F
- **Written exam**
  1.5 credits, grades: A/B/C/D/E/F

Students with a permanent disability who have been approved for directed educational support may be offered adapted modes of assessment.

6. Types of instruction and language of instruction

The teaching consists primarily of lectures and computer labs, with elements of group work and problem-based learning.

The teaching is conducted in English.

7. Course literature and other educational materials

Scientific articles and web materials. They are listed on a special list provided by the course coordinator.

8. Student influence

Student influence in the course is ensured by means of course evaluation. The students are informed about the results of the evaluation and potential measures that have been taken or are planned, based on the course evaluation.

9. Additional information

Further information about the course, as well as national and local governing documents for higher education, is available on the website of the University of Skövde.