UNIVERSITY OF SKÖVDE

TRANSLATION FROM SWEDISH

COURSE SYLLABUS

Methods and tools for software development in bioinformatics G2F

7.5 credits

Course code: BI503G
Version number: 5
Valid from: 1 January 2026
Ratified by: Curriculum Committee for Bioscience
Date of ratification: 14 August 2025

1. General information about the course

The course is provided by the University of Skövde and is named Methods and tools for software development in bioinformatics G2F (Metoder och verktyg för programutveckling inom bioinformatik G2F). It comprises 7.5 credits and is a first-cycle course. The level of progression is G2F.

The course is a part of the main field of study in Bioinformatics. The disciplinary domain of the course is Natural Sciences.

2. Entry requirements

Prerequisites for this course are the following passed courses: BI122G Introduction to Computational Tools for Bioinformatics G1N and BI319G Expression Analysis with R and BI121G Bioinformatic Analysis with Python G1N (or the equivalent).

Additional requirements: attended BI319G Expression analysis with R G1F with passed grade on Written Assignment 1 and passed grade on Seminar or passed grade on Written assignment 2 (or the equivalent).

Since the level of progression of the course is G2F the prerequisites are at least 60 credits in one or both of the subjects bioinformatics and bioscience, where the courses above are included.

3. Course content

The course aims to provide theoretical understanding and practical experience of the usage of tools for program development in bioinformatics. Initial parts of the course cover central concepts, such as version control for source code, documentation and how to create discrete environments for execution of complex software. It thereafter covers the concept of good programming practice and how to use collections of open source code to develop programs through collaboration. Tools for combining programs into analysis pipelines are introduced and coupled to computational resources provided through clouds and computer clusters. In addition to lectures that cover theory and principles, the usage of tools is practiced during supervised computer lab exercices.

4. Objectives

After completed course the student should be able to:

- describe the problem of program dependencies and versions thereof, and in practical applications apply tools for dependency control during software development,
- describe publically available collections of open source code and their usage for program development in bioinformatics; as well as describe and use tools for version control,
- explain the concept of good programming practice, describe the need for documentation of software, and apply these principles when developing programs,
- describe how collaborative program development can be organized as team work and use tools for collaboration during program development, and
- explain the principles for how computational resources can be made available by clouds and clusters, and apply tools for combining programs into a comprehensive analysis pipeline.

5. Examination

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

A final grade of the course is only issued when all the examination parts have been passed and is determined by an average of the grades for the examination parts Written assignment 1 and Written assignment 2. The average value is rounded to the nearest integer (half rounded up) and translated into a final grade of the course.

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

- **Written assignment 1**
  2.5 credits, grades: A/B/C/D/E/F
- **Oral presentation**
  2.5 credits, grades: G/U
- **Written assignment 2**
  2.5 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 comprises lectures, computer laboratory sessions and seminars.

The teaching is conducted in English.

7. Course literature and other educational materials

Scientific articles and other relevant material, as adviced by teachers of the course.

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.