UNIVERSITY OF SKÖVDE

TRANSLATION FROM SWEDISH

COURSE SYLLABUS

Python programming for bioinformatics A1N

10 credits

Course code: BI761A
Version number: 7
Valid from: 1 July 2026
Ratified by: Curriculum Committee for Bioscience
Date of ratification: 25 September 2025

1. General information about the course

The course is provided by the University of Skövde and is named Python programming for bioinformatics A1N (Pythonprogrammering för bioinformatiker A1N). It comprises 10 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. The disciplinary domain of the course is Natural Sciences.

2. Entry requirements

The course has the following entry requirements: a total of at least 90 passed credits in one or some of the subjects of Biology, Medicine or Computer Science. Of these 90 credits, at least 15 credits must be on the level of progression G2F (or the equivalent).

An additional 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. 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 covers procedural and object-oriented programming in the Python programming language, with the aim of solving bioinformatic problems and performing commonly used bioinformatic analyses. The course teaches methods to systematically design and implement a solution in Python based on a given bioinformatics problem. The student also learns how to use available packages for Python. Emphasis is placed on advanced programming concepts, such as using selected Python packages for bioinformatics applications, regular expressions for pattern matching and applying techniques for code optimization. The theoretical and practical concepts are concretized in computer lab exercises and programming assignments.

4. Objectives

After completed course the student should be able to:

- based on a general description of a bioinformatics problem in a structured way, analyze and break it down into smaller sub-problems and create a program in Python that solves the same,
- extensively describe fundamental concepts within procedural and object-oriented programming as well as differences between these programming paradigms,
- in an advanced way, implement programs in Python to solve bioinformatic problems and perform bioinformatic analyses,
- document programs implemented in Python using Jupyter Notebooks,
- in an advanced way, implement programs in Python that use available packages for bioinformatics applications,
- in an advanced way, implement programs in Python that visualize results from bioinformatic analyzes and apply regular expressions for pattern matching,
- apply common strategies to develop more efficient code and use good programming practice that follows the PEP8 Style guide for Python code.

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.

The final grade of the course is determined by the weighted average of the grades of the three written assignments; A=5, B=4, C=3, D=2 och E=1. The avarage value is rounded to the nearest integer (half rounded up) and translated into a final grade according to 5=A, 4=B, 3=C, 2=D och 1=E.

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

- **Written assignment 1**
  2 credits, grades: A/B/C/D/E/F
- **Written assignment 2**
  4 credits, grades: A/B/C/D/E/F
- **Written assignment 3**
  4 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 is comprised of lectures and laboratory sessions.

The teaching is conducted in English.

7. Course literature and other educational materials

The literature for the course consists of lecture slides and lecture notes, exercises, and other study material that will be made available on the course site.

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.