



UNIVERSITY
OF SKÖVDE

COURSE SYLLABUS

Python programming for bioinformatics A1N

10 credits

Course code: BI761A

Version number: 3

Valid from: 1 July 2022

Ratified by: Curriculum Committee for Bioscience

Date of ratification: 26 August 2021

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

Admission to the course requires a minimum of 90 credits in biology, medicine or computer science, including at least 15 credits at advanced level G2F (or equivalent).

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. This is normally demonstrated by means of an internationally recognized test, e.g. IELTS or TOEFL or the equivalent.

3. Course content

The course covers procedural and object-oriented programming in Python, with applications in solving bioinformatic problems and performing bioinformatic analyses. The course teaches methods for systematically designing and implementing a solution in Python, given a description of a bioinformatic problem. The student will also learn how code written in other programming languages, or libraries and applications from Biopython, can be included as part of the solution when developing a Python program. Emphasis is given to advanced programming concepts, such as using regular expressions for pattern matching and applying methods 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 bioinformatic problem, in a structured way analyze and break down the problem into sub-problems, and develop a Python program as a solution,
- extensively describe the fundamental concepts of procedural and object-oriented programming, and the differences between these programming paradigms,
- in an advanced way implement and document Python programs that solve bioinformatic programs or perform bioinformatic analyses,

TRANSLATION FROM SWEDISH

- develop Python programs that include Biopython and code written in other programming languages,
- develop Python programs that visualize results from bioinformatic analyses, and
- apply commonly used strategies for code optimization.

5. Examination

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

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 average 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 or alternative 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

The content of the course corresponds completely or partially with the following course(s) and cannot be included in the required credits of a degree qualification:

- K0001503 - Bioinformatic analysis with Python 2 7.5 hp
- BI121G - Bioinformatic Analysis with Python 1 7.5 hp

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.