UNIVERSITY OF SKÖVDE

TRANSLATION FROM SWEDISH

COURSE SYLLABUS

Introduction to AI in Bioinformatics A1N

7.5 credits

Course code: BI763A
Version number: 2
Valid from: 1 January 2027
Ratified by: Curriculum Committee for Bioscience
Date of ratification: 28 May 2026

1. General information about the course

The course is provided by the University of Skövde and is named Introduction to AI in Bioinformatics A1N (Introduktion till AI i bioinformatik 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 subject biology 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 equivalent knowledge) 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. This is normally demonstrated by means of an internationally recognized language test, e.g. IELTS or TOEFL or the equivalent.

3. Course content

This course provides a introduction into the evolution and use of AI in biology, with a focus on machine learning techniques. Students will explore both supervised and unsupervised approaches, particularly deep learning, and learn when and how to apply them in biological contexts. Through hands-on programming, students will implement and evaluate AI models, while also developing critical skills for structuring and preparing data-driven analyses in life sciences.

4. Objectives

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

- describe the historical and current developments in the field of AI, with emphasis on machine learning applied to biological data,
- in an in-depth manner explain and motivate when and how to use supervised and unsupervised learning in biological settings,
- in an in-depth manner explain how machine learning, with focus on deep learning, are designed and used for supervised and unsupervised learning,
- use programming platforms and libraries to implement and evaluate AI models in biological data settings,
- critically evaluate strategies to prepare and structure a machine learning analysis.

5. Examination

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

Grades for the entire course are only issued when all examination components have been passed and are determined by a weighted average of the grades of the three examination parts. The average value is rounded to the nearest integer (half rounded up) and translated to a final grade of the course.

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

- **Project presentation**
  3.5 credits, grades: A/B/C/D/E/F
- **Written examination in computer lab 1**
  2 credits, grades: A/B/C/D/E/F
- **Written examination in computer lab 2**
  2 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 of lectures, seminars and computer exercises.

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.