UNIVERSITY OF SKÖVDE

TRANSLATION FROM SWEDISH

COURSE SYLLABUS

Multivariate Biological Analysis with R A1F

7.5 credits

Course code: SY760A
Version number: 12
Valid from: 1 January 2026
Ratified by: Curriculum Committee for Bioscience
Date of ratification: 22 May 2025

1. General information about the course

The course is provided by the University of Skövde and is named Multivariate Biological Analysis with R A1F (Multivariat biologisk analys med R A1F). It comprises 7.5 credits and is a second-cycle course. The level of progression is A1F.

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

2. Entry requirements

The course has the following entry requirements: passed SY768A Data Analysis for Life Science A1N (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 test, e.g. IELTS or TOEFL or the equivalent.

3. Course content

Multivariate analysis includes different types of methods for analyzing several variables simultaneously. The course includes different types of analysis methods that will be applied on medical and biological multivariate data. The software R will be used throughout the course for all analyses. The multivariate techniques that are included in the course include, for example, principal component analysis, partial least squares, clustering analysis, classification methods and different types of validation techniques. The course also includes large scale analysis of genomic and proteomic data to identify potential biomarkers.

4. Objectives

After completed course the student should be able to:

- analyze and interpret multivariate biological data using graphical visualization in R,
- analyze large scale genomic and proteomic data with different multivariate techniques in R,
- validate results from multivariate analyses,
- report and discuss results from multivariate statistical analyses,
- critical review and present a scientific report in life sciences that include some of the multivariate methods that are included in the course, and
- describe the underlying theoretical basis for multivariate analysis.

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

- **Written assignment**
  1.5 credits, grades: G/U
- **Written examination in computer lab**
  5 credits, grades: A/B/C/D/E/F (determines the final grade)
- **Oral presentation**
  1 credit, grades: G/U

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 supervision and lectures.

The teaching is conducted in English.

7. Course literature and other educational materials

Tutorials and scientific articles.

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.