UNIVERSITY OF SKÖVDE

TRANSLATION FROM SWEDISH

COURSE SYLLABUS

Expression analysis with R G1F

7.5 credits

Course code: BI319G
Version number: 6
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 Expression analysis with R G1F (Expressionsanalys med R G1F). It comprises 7.5 credits and is a first-cycle course. The level of progression is G1F.

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

The course has the following entry requirements: passed BI119G Introduction to Bioinformatics G1N and attended BV311G Method and Design in Life Science G1F (or the equivalent).

3. Course content

The course introduces R as a programming environment for bioinformatic analysis of omics data. It teaches the basics of R programming and the student is trained in solving bioinformatics tasks. After the course the student should be able to solve bioinformatic tasks by loading data sets and performing quality control and analysis. The course is focused on practical applications and the students develop their skills in a set of exercises. The course prepares the student to use R in real applications using data from public databases.

4. Objectives

After completed course the student should be able to:

- install program packages in the R environment and use R in practical applications to load, organize and visualize data,
- use different data types and data structures in R,
- perform quality control of gene expression data in R,
- explain what normalization is and perform normalization of gene expression data in R,
- perform statistical analysis in R to identify differentially expressed genes,
- use R functions to perform clustering analysis of gene expression data,
- use R functions to perform and annotation analysis of gene lists and interpret the results, and
- use program packages from Bioconductor in practical applications.

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 a weighted average of the grades for the three examination parts. 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:

- **On-campus supervised written examination**
  2 credits, grades: A/B/C/D/E/F
- **Written assignment**
  3 credits, grades: A/B/C/D/E/F
- **Seminar**
  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 is comprised of laboratory sessions, lectures, seminars and exercises.

The teaching is conducted in English.

7. Course literature and other educational materials

Scientific papers and web materials. Specific list of literature provided by the teacher.

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.