1 Name, Scope and Level of the Course
The course is provided by the University of Skövde and is named Biomarkers - Data Analysis A1F. It comprises 7.5 credits and is on advanced level. The level of progression of the course is A1F.

2 Objectives
After completed course the student should be able to:
- analyze multivariate data to identify, combine and validate biomarkers,
- evaluate different scientific methods that are used to identify and analyze biomarkers, and
- critically review scientific articles in the area of analysis of biomarkers, and present the results of these articles orally, and discuss ethical aspects of the studies.

3 Course Content
The course integrates knowledge from previous courses in biomarkers and analysis of multivariate data. The course focuses on using methods like logistic regression, decision trees, ROC-curves, cross-validation and Kaplan-Meier analysis to combine, analyze and validate biomarkers. The statistical software R will be used on the majority of the computer labs, but other software tools might also be used. Genomic and proteomic data from different scientific articles will be used throughout the course. The course ends with a discussion and presentation of scientific articles in the relevant area.

4 Forms of Teaching
Teaching consists of lectures, computer exercises and presentations.

The teaching is conducted in English.

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

Registration of examination results:

<table>
<thead>
<tr>
<th>Name of examination</th>
<th>Credits</th>
<th>Grading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written assignments</td>
<td>2.5</td>
<td>G/U</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>1</td>
<td>G/U</td>
</tr>
<tr>
<td>Written examination in computer lab</td>
<td>4</td>
<td>A/B/C/D/E/F</td>
</tr>
</tbody>
</table>

1 Determines the final grade of the course.

Students with a permanent disability who have been approved for special educational support may be offered adapted or alternative examinations.

6 Admission Requirements
Prerequisite courses for this course are: passed SY763A-Experimental Design and Data Analysis for Life Science A1N and passed BV705A-Biomarkers in Molecular Medicine A1N and attended SY760A-Multivariate Biological Analysis with R A1F (or the equivalent).

A further requirement is proof of skills in English equivalent of studies at upper secondary level in Sweden,
known as English course 6 / English course B. This is normally demonstrated by means of an internationally recognized test, e.g. IELTS, TOEFL or the equivalent.

7 Subject, Main Field of Study and Disciplinary Domain

The course forms a part of the academic subject area of Systems Biology. The course is a part of the main field of study in Systems Biology at the University of Skövde. The disciplinary domain of the course is Natural Sciences.

Every course at the University of Skövde belongs to a subject. The division of subjects is used for follow-up and quality assurance. A main field of study is an area in which a degree can be awarded. Disciplinary domain is a division which is used by the government for the allocation of resources for studies at basic level and advanced level.

8 Approval of Course and Course Syllabus

The course was approved by the Curriculum Committee for Bioscience on 28 September 2017. This course syllabus was approved by the Curriculum Committee for Bioscience on 27 August 2020. It is valid from 1 January 2021 and replaces the course syllabus approved 28 May 2020.

9 Overlapping with Another Course

This course cannot constitute a part of a degree also containing a course the content of which is totally or partly equivalent to the content of this course.

10 Additional Information

Further information will be available on the university’s website before a course is given.

National and local regulations for higher education are available on the university’s website.

Upon completion of the course there will be a follow-up. The main purpose of this follow-up is to contribute to improvements of the course. The students’ experiences and views constitute one of the criteria for the follow-up and are gathered by means of course evaluations. The students will be informed of the results of the follow-up and any decisions regarding actions that are to be taken.

11 Course Literature and Other Educational Materials

Scientific articles.