

Bioinformatics for Precision Medicine: Biomarker Labs, 4 higher education credits

Bioinformatik för precisionsmedicin: Biomarkörer Lab, 4 högskolepoäng

Course Code/Codes	75MV004
Subject Area	Medical Science
School/equivalent	School of Medical Sciences
Valid from	2018-12-19
Approved	2018-12-19
Revised	-
Approved by	Head of School
Translation to English, date and signature	-

1 Course content

The course includes:

- Computer laboratory on bioinformatics tools to find diagnostic, prognostic and predictive patterns in functional profiling data
- Writing scientific results reports on biostatistics/bioinformatics analysis
- Learning and applying the concept of reproducible analysis

2 Outcomes

2.1 The course in relation to the doctoral programme

The course shall primarily refer to the following intended learning outcomes for third-cycle courses and study programmes as described in the Higher Education Ordinance, i.e. the doctoral student shall demonstrate:

Knowledge and understanding

- advanced and up-to-date specialised knowledge in a limited area of this field (part of outcome 1)
- familiarity with the methods of the specific field of research in particular (part of outcome 2)

Competence and skills

- the capacity for scholarly analysis and synthesis (part of outcome 3)
- the capacity to review and assess new and complex phenomena, issues and situations autonomously and critically (part of outcome 3)
- the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively (part of outcome 4)
- the ability to plan and use appropriate methods to undertake research and other qualified tasks within predetermined time frames (part of outcome 4)

The intended learning outcomes are listed in the same order as in the general syllabus for the programme.

2.2 Intended course learning outcomes

To obtain a passing grade, the doctoral student shall demonstrate:

- Knowledge and understanding of the concept of reproducible analysis
- Knowledge about and understanding for the process of biomarker filtering from molecular omics profiles by taking both univariate and multivariate approaches
- Knowledge and understanding about multiple testing
- Knowledge and understanding about supervised and unsupervised analyses

Skills and abilities

- Ability to prepare biostatistical/bioinformatics scripts using the statistical programming language R
- Ability to accurately report biostatistical/bioinformatics analyses results

3 Reading list and other teaching material

The following course readings and teaching material will be used on the course:

Dalgaard, Peter. (2002).
Introductory Statistics with R.

Gentleman, R et al., (2005).
Bioinformatics and Computational Biology Solutions Using R and Bioconductor

In addition, literature and scientific articles will be supplied. Changes in literature might occur.

4 Teaching formats

Teaching on the course takes the following format:

Lectures
Computer laboratory work
Group discussions
Independent study

5 Examination

The course is assessed through an examination in the format of a written examination covering all intended course learning outcomes.

Each student has to hand-in an individual analysis report.

6 Grades

Examinations on third-cycle courses and study programmes are to be assessed according to a two-grade scale with either of the grades 'fail' or 'pass' (local regulations).

The grade shall be determined by a teacher specifically nominated by the higher education institution (the examiner) (Higher Education Ordinance).

To obtain a passing grade on examinations included in the course, the doctoral student is required to demonstrate that he/she attains the intended course learning outcomes as described in section 2.2. Alternatively, if the course consists of multiple examinations generating credit, the doctoral student is required to demonstrate that he/she attains the outcomes that the examination in question refers to in accordance with section 5.

A student who has failed an examination is entitled to a retake.

If an examination consists of several examination components, and a student fails an examination component, the examiner may, as an alternative to a retake, set a make-up assignment with regard to the examination component in question.

A doctoral student who has failed an examination twice for a specific course or course element is entitled, upon his/her request, to have another examiner appointed to determine the grade.

7 Admission to the course

7.1 Admission requirements

To gain access to the course and complete the examinations included in the course, the applicant must be admitted to a doctoral programme at Örebro University.

7.2 Selection

Selection between applicants who have been admitted to doctoral programmes at Örebro University and who otherwise meet the admission requirements as listed above is made according to the following order of precedence:

1. Research students from Örebro University.
2. Research students from other higher education institutions.

If no other selection criteria are specified in this section, priority shall be given to applicants with a lower number of course credits left before the award of their degree over applicants with a higher number of remaining course credits. Should two or more students have equal number of credits, selection will be done through the drawing of lots. This also applies within any selection groups listed unless otherwise stated.

7.3 Other applicants than doctoral students admitted at Örebro University

Other applicants than doctoral students admitted at Örebro University may be given access to the course on the grounds of provisions for and/or agreements regarding contracted courses, joint degrees, national graduate schools or cooperation in other respects with other universities.

Any decisions on what such other applicants may be given access to the course are made separately and on the basis of the provisions and/or agreements that occasion the student to apply for the course.

For participation in the course in other respects, the same provisions shall apply as for doctoral students admitted to Örebro University.

8 Transfer of credits for courses, study programmes and other experience

Provisions on the transfer of credits can be found in the Higher Education Ordinance and on the university's webpage.

9 Other information

The language of tuition on the course is English with lecturer-led components concentrated to full-time intensive weeks with compulsory attendance. Doctoral students are expected to undertake independent study reading during and after these course weeks.

Transitional provisions