



**Karolinska
Institutet**

Course syllabus for

Omics in science - bioinformatic analysis and visualization of gene regulation, 3.5 credits

Omics inom forskning - Bioinformatisk analys och visualisering av genreglering, 3.5 hp

This course syllabus is valid from autumn 2023.

Course code	4FF012
Course name	Omics in science - bioinformatic analysis and visualization of gene regulation
Credits	3.5 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Translational Physiology and Pharmacology
Level	AV - Second cycle
Grading scale	Pass with distinction, Pass, Fail
Department	Department of Physiology and Pharmacology
Decided by	Education committee FyFa
Decision date	2023-02-02
Course syllabus valid from	Autumn 2023

Specific entry requirements

At least the grade Pass on the courses Integrated physiology and pharmacology (semester 1) and Physiological and pharmacological mechanisms and experimental methods (semester 2) on the Master (120 credits) programme in Translational Physiology and Pharmacology.

Objectives

The aim of the course is to obtain knowledge about handling, analysis, interpretation and presentation of large dataset (omics), and to give an overview of the typical methods that result in large amounts of data.

On completion of the course, the student should be able to:

- Explain opportunities and challenges in handling large databases and omics data
- Perform differential gene expression analysis using R
- Utilize R and apply its basic functions for bioinformatic analysis, interpretation and data visualisation

Content

Large-scale datasets will become more and more important in the future of biomedical research. Based on previous basic experience in bioinformatics, in this course students will use R to approach data sets and analyse, interpret and visualise them in a more comprehensive way. Application of different types of omics data, its challenges and opportunities in relation to scientific questions.

Teaching methods

The course contains lectures, practical sessions and seminars with group discussion.

Examination

Written examination (exam). Graded Fail/Pass/Pass with distinction.

Oral presentation of performed analysis and visualisation. Graded Fail/Pass.

To pass the course (the grade Pass or higher), at least passed is required on all components of the course. To pass the course with distinction, the grade Pass with distinction on the written examination is required.

Compulsory participation

Participation in practical sessions is compulsory. The examiner decides if, and how, absence from compulsory parts can be compensated. Study results cannot be reported until the student has participated in compulsory course elements or compensated for any absence in accordance with instructions from the examiner. Absence from a compulsory educational component may mean that the student cannot take the opportunity until the next time the course is given.

Limitation of number of examinations

The students who have not passed the course according to the schedule are allowed to revise and hand in the report and/or do the oral presentation for at most five additional occasions. If the student has failed six times in total, no further examination or continued course participation is allowed. As submission, the times that the student submitted a revised version of the assignment and/or orally presented to examining teachers is counted.

The students that have not passed after regular examination session have the right to participate at further five examination sessions. If the student has carried out six failed examinations/tests, no additional examination or new course admission is approved.

Each occasion the student participates in the same test counts as an examination. Submission of a blank exam paper is regarded as an examination. In case a student is registered for an examination but does not attend, this is not regarded as an examination.

In the event of special circumstances, or if a student with a disability is in need of certain adjustments, the examiner may decide to depart from the syllabus' regulations on examination form, number of examination opportunities, possibility of completion or exemption from compulsory educational elements, etc. Content and intended learning outcomes as well as the level of expected skills, knowledge and abilities must not be altered, removed or lowered.

Other directives

The course is offered in English. Course evaluation is carried out according to the guidelines that are established by the Committee for education at basic level and second cycle.

Literature and other teaching aids

Recommended literature

Relevant literature will be provided during the course.