**SC00035 R programming, 2 credits**

R programmering, 2 högskolepoäng

*Third-cycle level / Forskarnivå*

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**Confirmation**

This syllabus was confirmed by the Council for PhD Education at Sahlgrenska Academy on 2019-09-18, and is valid from Spring semester 2020.

*Responsible Department*

Core Facilities, Sahlgrenska Academy

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**Entry requirements**

The course is open for PhD students accepted by a Swedish or international university, in need to analyze different sets data using R.

In order to apply for the course you should have:

A background in genetics, cell biology, biomedicine, biochemistry, bioinformatics or similar

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**Learning outcomes**

After completing the course the student is expected to be able to:

**Knowledge and understanding**

- Interpret simple R scripts
- Describe and summarize basic statistics used in data analysis
- Define suitable data analysis workflows
- Evaluate the main variables in the experimental design of a project

**Competence and skills**

- Use (fundamental) commands in R for data manipulation, statistical tests, and plotting graphs and diagrams
- Write R code as a script
- Use and when needed modify existing R scripts
Use help pages to understand commands and solve problems
Use web resources such as CRAN and Bioconductor to install suitable packages

**Judgement and approach**
- Design and establish custom approaches for analyzing, visualizing and interpreting data
- Translate simple research questions of interest into appropriate R workflows
- Formulate how R scripts can be created according to the data analysis workflow
- Assess which factors are important to consider for a well-designed experiment

**Course content**
This is a hands-on course that introduces the statistical software R. You will learn to analyze data and visualize the results. The course includes a combination of lectures and practical sessions.
The course covers:
- Introduction to R programming and scripting
- Visualization in R
- Introduction to statistical analysis in R
- Experimental design

**Types of instruction**
The course includes a combination of lectures, practical sessions and home assignments

**Language of instruction**
The course is given in English.

**Grades**
The grade Pass (G) or Fail (U) is given in this course.
Rating scale: Fail (U), Pass (G). To receive a passing grade, the student is required to complete all practical sessions and demonstrate that the learning objectives have been reached

**Types of assessment**
Assessment will be done through the computer home assignment; these are designed to test if the learning objectives are reached, so completion of them is mandatory for a passing grade.
Attendance of at least 80% of the lectures and practical sessions is also mandatory.

**Course evaluation**
The course evaluation will be done through a written questionnaire, available at the virtual learning environment, where students are asked to describe their opinions on the various stages of the course for future development. This information will be compiled and shared with
students who participated in the evaluations. Improvements are shared with students participating in the next emission of the course

**Other information**

Computer access with administration rights as well as internet access is required since all communication concerning the course and relevant documents, such as lectures, exercises and literature, will be posted at the virtual learning environment.

Scientific papers and handouts will be provided during the course.