

# Syllabus

for course at advanced level

**R Programming**  
**R programming**

**7.5 Higher Education  
Credits**  
**7.5 ECTS credits**

<b>Course code:</b>	ST4102
<b>Valid from:</b>	Autumn 2021
<b>Date of approval:</b>	2021-01-20
<b>Department</b>	Department of Statistics
<b>Main field:</b>	Statistics
<b>Specialisation:</b>	A1N - Second cycle, has only first-cycle course/s as entry requirements

## Decision

This syllabus was approved by the board of the Department of Statistics on January 20, 2021.

## Prerequisites and special admittance requirements

90 ECTS credits first-cycle (basic level) courses, of which 30 ECTS credits in Statistics, or equivalent.  
English 6 or equivalent.

## Course structure

Examination code	Name	Higher Education Credits
11RT	R Programming, exam	4.5
12RI	R Programming, home assignment	3

## Course content

The course consists of one part and is examined through two tests in accordance with the exam codes above, 11RT which is referred to as Test 1 and 12RI as Test 2.

The course covers programming in the programming language R, with focus on basic as well as more advanced statistical analysis. Particular emphasis is placed on data structures, functions and objects, strings, conditional statements, iteration, code performance optimization, debugging, numerical linear algebra and developing R packages. The course also provides an introduction to object-oriented programming and parallel programming.

## Learning outcomes

To pass the course, the student must be able to:

- write and organize R programs with programming techniques such as handling of different data structures, self-written functions, iteration, conditional statements, string handling, and numerical calculations, aimed at conducting statistical analysis.
- perform statistical calculations and simulations using R packages
- enhance R program code by code optimization methods
- test and debug R programs
- organize self-written code in the form of an R package
- explain the principles of object-oriented programming
- explain how parallel programming is implemented in R.

## Education

The instruction consists of lectures and computer labs. The language of instruction is English. More detailed information may be found in the course description. The course description is posted on the Department of Statistics' website [www.statistics.su.se/utbildning](http://www.statistics.su.se/utbildning) no later than one month before the start of the course.

### **Forms of examination**

a) The course is examined by assessing the students' mastery of the expected outcomes. Test 1 is examined by means of a written individual exam. Test 2 is examined by means of a written home assignment that is done in groups. The examination is in English.

b) Test 1 is graded according to a seven-point grading scale: A = Excellent, B = Very Good, C = Good, D = Satisfactory, E = Sufficient, Fx = Insufficient, F = Completely insufficient. Both Fx and F are failed grades that require re-examination.

Test 2 is graded according to a two-point grading scale: U = Fail, G = Pass. An assessment of the individual's performance, within the working group, must be made possible and documented.

c) The grading criteria for Test 1 and Test 2, respectively, are communicated in writing to the students at the start of the course.

d) In order to pass the entire course, a minimum grade of E on Test 1 and grade G on Test 2 is required. The final grade for the entire course is equal to the grade on Test 1. Examination assignments that are not submitted on time will not be assessed. Parts of courses that have been transferred and credited are excluded when determining the final grade.

e) For each course instance, at least two examination opportunities must be provided for all tests. During a semester when the course is not offered, at least one examination opportunity must be provided for all tests.

Students who fail either of the two tests are entitled to take additional tests as long as the course is offered in order to achieve a passing grade.

Students who have received the grade Fx or F on Test 1 or the grade U on Test 2 twice in a row by one and the same examiner have the right to have another examiner appointed at the next exam, unless there are special reasons that militate against it. A request to this effect must be sent in writing to the head of department.

Students who have received a grade of E or higher, may not retake a test in order to obtain a higher grade.

f) It is not possible for students who have received the grade Fx to increase the grade to a passing grade by submitting supplementary assignments.

### **Interim**

When this syllabus is repealed, the student has the right to be examined once per semester according to the present syllabus during a completion period of three semesters. A request to this effect must be sent in writing to the Head of department.

### **Limitations**

This course may not be part of a degree together with the course R Programming, 7.5 ECTS credits (ST4101) or any other course which fully or partially conforms with the contents of this course.

### **Misc**

The course replaces the course R Programming, 7.5 ECTS credits (ST4101).

### **Required reading**

The course literature is specified separately in an attachment. The current course literature (and other teaching resources) is posted on the Department of Statistics' website, [www.statistics.su.se/utbildning](http://www.statistics.su.se/utbildning), no later than two months before the start of the course.