Syllabus

for course at first level

Programming Techniques for Mathematicians
Programmeringsteknik för matematiker

7.5 Higher Education Credits
7.5 ECTS credits

Course code:	DA2004
Valid from:	Spring 2016
Date of approval:	2015-08-21
Department	Department of Mathematics (incl. Math. Statistics)

Main field:	Computer Science
Specialisation:	G1F - First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Decision

This syllabus has been approved by the Board of the Faculty of Science at Stockholm University, August 21, 2015.

Prerequisites and special admittance requirements

For course admission knowledge equivalent to Mathematics I, 30 HECs (MM2001) is required.

Course structure

Examination code	Name	Higher Education Credits
THEO	Theory	1.5
INDU	Individual Assignment	3
LABO	Practical Exercises	3

Course content

The course covers: Fundamental computer concepts. Programming in a modern programming language (Python). Data structures and classes. Problem solving by dividing the problem into sub-problems. Program structuring. Several small programming exercises and one larger, individual programming exercise with emphasis on structuring and specification of the modules being used.

b. The course includes the following elements:
• Practical Exercises, 3 HECs
• Individual Assignment, 3 HECs
• Theory, 1.5 HECs

Learning outcomes

It is expected that the student after taking the course will be able to:
• solve problems, independently and in groups, by designing programs of up to five hundred lines in a modern programming language,
• follow the rules of the programming language syntax,
• apply and explain the rules of good programming style (such as user friendliness, comments, error handling, structuring, flexibility),
• detect and correct programming errors,
• modify a given program

- transfer data between files and programs,
- identify where control structures (conditionals and loops) are needed, and use these,
- split a large problem into manageable parts and construct functions for these,
- use built-in data structures and select data structures that are suitable for the current problem,
- use classes and construct new classes,
- review other people's programs,
- use other people's programs as building blocks in one's own projects,
- use tools to develop programs together with other developers.

Education

The education consists of lectures and practical exercises.

Participation in practical exercises and group education associated with this is compulsory. An examiner may rule that a student is not obliged to participate in certain compulsory education, if there are special grounds for this, after consultation with the relevant teacher.

Forms of examination

a. Examination for the course is in the following manner: written examination of the element Theory, written presentation of the element Practical Exercises, and written and oral examination of the element Individual Assignment.

b. Grading is carried out according to a 7-point scale related to learning objectives:
A = Excellent
B = Very Good
C = Good
D = Satisfactory
E = Sufficient
Fx = Fail
F = Fail

Grading of the element Practical Exercises is carried out according to a 2-point scale:
G = Pass
U = Fail

c. Grading criteria for the course will be distributed at the start of the course.

d. A minimum grade of E is required to pass the course, together with
- pass of the element Practical Exercises,
- participation in all compulsory education.

e. Students who receive a failing grade on a regular examination are allowed to retake the examination as long as the course is still provided. The number of examination opportunities is not limited. Other mandatory course elements are equated with examinations. A student who has received a passing grade on an examination may not retake the examination to attain a higher grade. A student who has failed the same examination twice is entitled to have another examiner appointed. Such requests should be made to the departmental board. The course has at least two examinations for each academic year in the years in which instruction is provided. Intervening years include at least one examination.

f. Students awarded the grade Fx are given the opportunity to improve their grade to E. The examiner decides the supplementary assignments to be performed and the pass mark criteria. The supplementary assignments will take place before the next examination session.

Interim

Students may request that the examination be conducted in accordance with this course plan even after it has ceased to be valid. However, this may not take place more than three times over a two year period after course instruction has ended. Requests must be made to the departmental board. The provision also applies in the case of revisions to the course plan.

Limitations

The course may not be included in a degree together with the course Computer Science I, FL (DA2001), Programming Techniques, FL (DA2003), or the equivalent.

Misc

The course is a component of the Bachelor's Programme in Mathematics, and the Bachelor's Programme in

Biomathematics and Computational Biology.

Required reading
Course literature is decided by the departmental board and is described in an appendix to the syllabus.