



LUND
UNIVERSITY

Faculty of Science

NUMA22, Tools in Computational Mathematics , 7.5 credits

Beräkningsmatematikens verktyg, 7,5 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2012-10-02 to be valid from 2012-10-02, spring semester 2013.

General Information

The course is an elective course for first-cycle studies for a Bachelor of Science in mathematics.

Language of instruction: English and Swedish
The course will be given in English upon request.

Main field of studies

Mathematics

Depth of study relative to the degree requirements

G1F, First cycle, has less than 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is that students on completion of the course should have acquired the following knowledge and skills: Knowledge and understanding On completion of the course, the student should have shown knowledge of Python as a programming language by having written his or her own computational programs. Skills and abilities On completion of the course, the student should have a good basis in computational programming for later courses. This involves being able to convert algorithms to program code and to be able to visualise, interpret and assess numerical results critically. Judgement and approach On completion of the course, the student should be able to present solutions to problems and numerical results in written and graphical form with adequate terminology and in a logical and well-structured manner.

Course content

The student learns how to solve practical problems by means of modern numerical methods and computers. Python's basic functions and data types: Arithmetic operations, arrays for vectors, matrices, graphic functions, lists, tuples, dictionaries, file management Syntax: [for], [if-else], [while], list comprehensions, generators. Built-in functions, student-defined functions and modules. Classes and inheritance applied to mathematical objects. Test and profiling Knowledge about the differences in syntax between Python and MATLAB syntaxes in order to be able to use both tools in later courses.

Course design

The teaching consists of lectures and computer exercises. Participation in the computer exercises and other teaching connected with them is compulsory.

Assessment

Examination takes the form of computer exercises during the course and through a larger programming project that should be carried out in groups.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass.

To pass the entire course, passed laboratory sessions and passed presentation of the programming project are required as well as participation in all compulsory parts.

Entry requirements

For admission to the course, knowledge equivalent to the courses MATA14 Analysis 1, 15 credits, MATA15 Algebra 1, 15 credits and MATB11 Linear algebra, 7.5 credits, or equivalent are required together with English B.

Further information

The course may not be included in a higher education qualification together with any of the courses NUM131 Computational Programming, 15 credits, and NUMA21 Tools of Computational Mathematics, 7.5 credits.

Subcourses in NUMA22, Tools in Computational Mathematics

Applies from V13

1201 Tools in Computational Mathematics, 7,5 hp
Grading scale: Fail, Pass