Programming Tools for Numerical Calculations 7.5 credits C0004M

Programmeringsverktyg för numeriska beräkningar

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2022-02-14

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Programmeringsverktyg för numeriska beräkningar

First cycle, C0004M

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Teknisk- vetenskapliga beräkningar	Mathematics

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and 22,5 hp of mathematics including calculus of differentiation and integals, differential equations and linear algebra
Exampel M0047M/M0029M + M0048M/M0030M + M0049M/M0031M
or
M0050M + M0051M + M0052M
or
M0057M + M0058M + M0059M
or equivalent.

Selection

The selection is based on 1-165 credits.

Course Aim

After completing the course, the student will

- have basic knowledge on computer programming.
- have insight in the problems that may occur when using floating point arithmetics on a computer.
- know of numerical algorithms for finding approximate solutions to problems from calculus and linear algebra.
- be able to write programs that use these algorithms to solve numerical problems.
- know how to formulate a mathematical model from a text, and then find its solution thorough numerical computations.
- be able to evaluate the validity of the result, and its implications, given the model and the chosen algorithm.

Contents

Programming structures, vectorized operations in Matlab, data types in Matlab, functions, visualization, floating point representation, non-linear equations, systems of linear equations, linear least-squares problems, numerical quadrature, numerical differentiation, initial value problems, stiff problems, boundary value problems, finite difference approximation of PDE.

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.
The teaching constists of lectures and computer tutorials

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Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.
To pass the course, the student must
- pass the assignments
- pass the exam
The level of the grade is set by the exam

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Course offered by

Department of Engineering Sciences and Mathematics

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Written exam	G U 3 4 5	4	Mandatory	A14	
0002	Assignments	U G#	3.5	Mandatory	A14	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Niklas Lehto, Programme Director 2022-02-14

Syllabus established

by Mats Nässström 2014-02-14

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