EL2310 Scientific Programming 7.5 credits

Programmeringsteknik

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for EL2310 valid from Autumn 2013

Grading scale

P, F

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

For single course students: 120 credits and documented proficiency in English B or equivalent.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The goal of the course is to provide the participants with a basic knowledge in programming in general and specifically in MATLAB, C and C++.

After completing the course, the participants should:

- be able to demonstrate and discuss basic concepts in programming such as loops, recursion, memory access and object oriented programming.
- be able to read in, process and display data in MATLAB
- solve problems and implement algorithms in MATLAB
- be skilled enough in the use of MATLAB to understand programs written in MATLAB and to independently learn about more advanced features of MATLAB.
- be able to read in and process data in programs written in C and C++
- be able to solve problems and implement algorithms in C and C++
- be able to describe what simple programs written in C or C++ do, i.e., be able to read and understand existing code in those programming languages.
- be able to document their code and have an understanding of the importance of writing code that others can understand also.
- be able to change code, correct errors and build upon existing code in MATLAB, C and C++.

Course contents

The course focuses on providing the participants with the tools that are needed to work in research and development in an environment where computers are becoming increasingly more important. To instruct computers, programming is needed.
The following will be covered in the course:

- Basic general concepts in programming such as variables, functions, objects, classes, etc.
- Basic programming, input/output of data, processing of data and visualisation in MATLAB
- Basic programming, input/output of data and processing in C/C++ and basic concepts in object oriented programming.

Disposition

The exact lecture distribution will be updated along the course, but a rough outline is :

- Introduction: course outline, motivating examples, [L1]
- MATLAB using it as a tool and programming [L2-L5]
- Programming in C [L6-L12]

- Programming in C++ [L13-L16]

Course literature

Det finns ingen kursbok. Föreläsningsanteckningar distribueras online

För de studenter som trots allt önskar en bok rekommenderas

- MATLAB
  F. Gustafsson och N. Bergman, Matlab for Engineers Explained, Springer Verlag, 2003 (ISBN 1-85233-697-8)
- C
  Kernighan and Ritchie, The C programming language, 2nd edition, Prentice Hall (ISBN 0-13-110362-8)
- C++
  Stroustrup, The C++ programming language, Addison Wesley

There is no dedicated course book. Lecture notes will be distributed online. For those who would like a book, the following are recommended:

- MATLAB
  F. Gustafsson och N. Bergman, Matlab for Engineers Explained, Springer Verlag, 2003 (ISBN 1-85233-697-8)
- C
  Kernighan and Ritchie, The C programming language, 2nd edition, Prentice Hall (ISBN 0-13-110362-8)
- C++
  Stroustrup, The C++ programming language, Addison Wesley

Examination

- LAB1 - Programming in MATLAB, 2.5 credits, grading scale: P, F
- LAB2 - Programming in C, 2.5 credits, grading scale: P, F
- LAB3 - Object Oriented Programming, 2.5 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

To pass the course, the students need to successfully complete each of the three projects: MATLAB, C and C++.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.