

## **Introduction to Programming (1100-2010)**

60 hours (30 lecture hours, 30 lab classes hours), winter semester

Prerequisite courses:

- Computing Workshop (1100-1006) or Advanced Computing Workshop (1100-11F22)

Recommended preceding courses:

- Computing Workshop (1100-1006)
- Advanced Computing Workshop (1100-11F22)

Students who complete the course will know how to find an algorithmic solution of a simple computational problem and how to create a program in C++ working in accordance with given algorithm, including the input of data from a text file and the output of results into a text file.

Main topics:

1. Introduction
  - a) Why it is useful to know computer programming
  - b) Algorithms, source code as a representation of an algorithm
  - c) Source code and program, compilation and execution of a program
2. The C++ language basics
  - a) The simplest program, the structure of a program
  - b) The output of results
  - c) Variables, operators and expressions
  - d) Conditional statement and loops
  - e) The input of data
  - f) Functions
3. Files, input and output in C++
  - a) Files and streams
  - b) Using files, file-based input and output
  - c) Standard input and output streams
4. Arrays in C++
  - a) One dimensional arrays and their applications
  - b) Sorting of arrays (simple sorting algorithms)
  - c) Strings as character arrays, common string operations
  - d) Arrays and pointers, arrays of strings, the arguments of a program
  - e) Dynamic allocation of memory
5. Matrices and vectors
  - a) Representing matrices and vectors as arrays

- b) Common operations on matrices and vectors
- c) Solving linear equations
- 6. Composite data types and their applications
  - a) Structures and unions
  - b) Classes