



COURSE: Computer Science

TEACHER: Russo Maria Grazia

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LANGUAGE

ECTS: 6 CFU

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TOPICS

Architecture of Information Systems: basic Architecture; binary representation of the information.

Life cycle of a program. Problem, algorithm, programs. History of programming languages. The compiler function and build process. The linker: linking process. Examples of compilers and linkers.

Introduction to C++ programming: basic elements, variables, assignments and expressions, simple data types, control structures, input and output operations, file management.

Subprograms: procedures and functions, parameter passing. Modular programming methodologies.

Structured data types: one and two dimensional arrays, records. Basic algorithmic solutions.

Basic Elements of Fortran.

Introduction to the platform for programming MatLab. Basic elements for programming, subroutines, structured types, vectorization.

TEACHING METHODS (please tick one or more options)

Theoretical lessons

Tutorials in classroom

Tutorials in laboratory

Project works

Technical visits

Other activities (please specify) _____

TEXTBOOKS

- Educational material provided by the teacher.
- John R. Hubbard -- Programmare in C++ (II Edizione, 2001) -- McGraw Hill Libri Italia - Milano

ON-LINE EDUCATIONAL MATERIAL

web address: _____

LEARNING OUTCOMES

The educational objectives related to knowledge and understanding for this course require that the students acquire the basics of knowledge of procedural programming, even in a modular form, in several languages, with particular details relating to the languages C++ and Matlab.

From the point of view of the ability to apply the acquired knowledge the student will be able to produce code in C++ and Matlab for the resolution of problems of simple and medium complexity, particularly with regard to the manipulation of matrices and numerical data.

REQUIREMENTS

EVALUATION METHODS (please tick one or more options)

Intermediate verifications



xWritten examination

Discussion of a project work

x Practical test

Oral examination

Other methods (please specify) _____

DETAILED CONTENT

Introduction to Programming:

- basic elements of procedural languages (types, variables, control structures, structured types, input / output, use of sequentially accessed files)
- syntax and semantics of the programming language C++
- Basic algorithmic techniques on the collections (sum, count, maximum and minimum, conditional, exchange and their variants)
- algorithmic techniques on the basis of mathematical matrices
- Ability to design and develop algorithmic solutions of varying complexity
- acquisition of data from a file in free format
- Ability to program in multiple languages, the ability to apply the concepts and techniques provided by the minimum standard FORTRAN
- knowledge of the techniques for testing and verification of the code.

Modular programming:

- modular programming techniques, design and development of the sub-programs and parameter passing, execution model, use of libraries.

Matlab / FreeMat:

- syntax and semantics for programming in MatLab
 - indexing and vectorization;
 - knowledge of the main Matlab functions related to the Matrices Algebra.
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SEMINARS BY EXTERNAL EXPERTS YES NO

FURTHER INFORMATION
