



COURSE: Computer Science

ACADEMIC YEAR: 2019-20

TYPE OF EDUCATIONAL ACTIVITY: Basic

TEACHER: Nicola Capuano

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Language: Italian

ECTS: 6

n. of hours: 60

Campus: Potenza

Semester: II

Dept./School: School of Engineering

Program: Civil-Environmental Engineering,
Mechanical Engineering

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOME

The main educational objective of this course is to provide students with the basics of procedural programming, even in modular form, with particular attention to the C++ and Matlab languages.

At the end of the course, the student will be able to write code for solving simple and medium complexity problems, with special regard to the manipulation of matrices and numerical data. In particular, the student will be able to analyse the problem, identify a solution algorithm and independently compose the basic techniques acquired in order to produce a resolutive program.

PRE-REQUIREMENTS

No particular prerequisites are required except for the ordinary use of a personal computer for writing texts, the use of e-mails and the ability to access websites.

SYLLABUS

1. **Introductory concepts** (4 hours):
Elements of computer architecture, programming languages, software development tools.
 2. **Basic elements of programming** (10 hours + 2 hours of exercises):
Statements, assignments, expressions, strings, data reading and printing, details in C++.
 3. **Control structures** (6 hours + 2 hours of exercises):
Conditional structures, cyclic structures, basic algorithmic techniques (counting, summing with accumulation, flag variable), details in C++.
 4. **Sub-programs** (10 hours + 2 exercises):
Modular programming (syntax and semantics), types and parameter passing, details in C++.
 5. **Structured types** (8 hours + 2 hours of exercises):
One-dimensional arrays, multidimensional arrays, basic algorithmic techniques (search for maxima and minima, verification of conditions), details in C++.
 6. **Matlab** (10 hours + 4 hours of exercises):
Basic elements, modular programming, structured types, linear indexing and logical indexing, vectorization (construction, access and algorithmic techniques).
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TEACHING METHODS

The course includes 60 hours of teaching including lessons and exercises. In particular, 48 hours of classroom lessons and 12 hours of classroom exercises are provided.

EVALUATION METHODS

Intermediate tests, written exam.

There are 2 intermediate tests and consist of a questionnaire with multiple choice and open-ended questions. Each questionnaire consists of about 20 questions. The first test is aimed at verifying the knowledge of topics 1 to 3, while the second is related to topics 4 to 6. The final mark for those who take the intermediate tests is calculated by adding 2 to the arithmetic average of the marks obtained in the two tests.

The written exam consists of a questionnaire with multiple choice and open-ended questions consisting of about 30 questions that cover all the topics explained during the course. The test is passed if the student scores a minimum of 18/30. The questionnaires of the written exam, as well as those of the intermediate tests, consist of questions of 3 different difficulties. The basic questions are aimed at evaluating the understanding of the basic elements (minimum skills). Intermediate level questions assess the ability to apply knowledge to simple problems. Third level questions (exercises) require reasoning skills and deeper knowledge of the course topics.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Educational material provided by the teacher;
- John R. Hubbard, Programmare in C++ (II Edizione, 2001), McGraw Hill Libri Italia, Milano.
- William J. Palm; Matlab: un'introduzione per gli ingegneri; McGraw-Hill.

INTERACTION WITH STUDENTS

Information about the course, the exam procedures, the teaching material and the announcements is available online on the teacher's Web page.

Weekly office hours: Thursday from 15.00 to 17.00 at the teacher's office (School of Engineering, Floor IV, Room 14). The teacher is also available through his email.

EXAMINATION SESSIONS (FORECAST)¹

21/02/2020, 01/07/2020, 27/07/2020, 25/09/2020, 06/11/2020, 18/12/2020

SEMINARS BY EXTERNAL EXPERTS YES ☐ NO ☒

FURTHER INFORMATION

¹ Subject to possible changes: check the web site of the Teacher or the Department/School for updates.