Università degli Studi della Basilicata
Dipartimento di Matematica, Informatica ed Economia

COURSE: Fundamentals of Computer Science	
ACADEMIC YEAR: 2017-18	
TYPE OF EDUCATIONAL ACTIVITY: Basic	
TEACHER: Russo Maria Grazia	
e-mail: mariagrazia.russo@unibas.it	website:
phone: 0971 205847	mobile (optional): 320 4235379
Language: Italian	

ECTS: 6	n. of hours: (60	Campus: Potenza School: DiMIE Program: Mathematics (first level)	Semester: II

EDUCATIONAL GOALS AND EXPECTED 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

PRE-REQUIREMENTS
No pre-requirements are needed.

SYLLABUS
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
• 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.

TEACHING METHODS
Theoretical lessons, Classroom tutorials.
The course includes 60 hours of teaching. In particular it is provided 48 hours of lectures and 12 hours of classroom exercises.

EVALUATION METHODS
Intermediate verifications, Written examination (multiple choice test), Written examination (optional)

The intermediate tests are 2 and consist in a multiple choice questionnaire. Each questionnaire consists of 30 questions. It is also provided a recovery test for those who have not obtained a score of at least 16/30 in the first

test.
The final vote for those who support the intermediate tests is calculated by adding 2 to the arithmetic average of the votes obtained in the two tests.

The written examination consists in a multiple-choice questionnaire of 45 questions relating to all the topics covered in the course. The test is successful if the student reports a minimum score of 18/30.

The written exam questionnaires as well as those of the intermediate tests, are constructed with questions of 3 different difficulties. The basic questions are aimed at evaluation of the study and understanding of the basic elements (minimum skills). The intermediate level questions assess the ability to apply knowledge to simple problems. The third-level questions require reasoning skills and better understanding of the various topics covered.

Those who have passed the written examination, on request can support further written exam with open-ended questions and fragments of C ++ code and Matlab of which interpret and simulate the operation in memory.
For students who pass the optional test, the final grade is determined by performing the arithmetic mean of the scores achieved in the written tests.

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

INTERACTION WITH STUDENTS
The first lesson of the course is the description of the objectives, the program of verification and all information related to the operation methods, including the description of the web page of the course.
The file of the presentation of the first class is loaded on the course website and available to students.
Access to the course website, which is part of an e-learning platform (Moodle) is free and contains, in addition to all the material used during the course, a Forum News that allows the teacher to directly communicate with students and vice versa.
The site also has a module that allows students to "sign up" and be able to book for the course tests.
Weekly office hours: Thursday from 15.30 to 17.30 at the office of the teacher (3D-building room 216)
In addition to weekly reception, the teacher is available through its e-mail (mariagrazia.russo@unibas.it), mobile phone (3204235379), and the aforementioned News Forum of the course web site.

EXAMINATION SESSIONS (FORECAST)[1]
22/02/2018, 02/07/2018, 23/07/2018, 17/09/2018, 05/11/2018, 17/12/2018

SEMINARS BY EXTERNAL EXPERTS   YES □   NO X

FURTHER INFORMATION

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