

## COURSE DESCRIPTION – ACADEMIC YEAR 2023/2024

<b>Course title</b>	<b>Fundamentals of Programming</b>
<b>Course code</b>	42611
<b>Scientific sector</b>	INF/01
<b>Degree</b>	Bachelor in Wood Engineering
<b>Semester</b>	2
<b>Year</b>	1
<b>Credits</b>	3
<b>Modular</b>	No

<b>Total lecturing hours</b>	30
<b>Total lab hours</b>	30 (see related syllabus)
<b>Attendance</b>	Attendance is not compulsory for lectures, albeit highly recommended. Attendance is compulsory for labs to profit from the course material (e.g., programmable boards) which cannot be borrowed outside class hours.
<b>Prerequisites</b>	Basics of mathematics.
<b>Course page</b>	Microsoft Teams, code communicated at the start of the course.

<b>Specific educational objectives</b>	<p>The course belongs to the type "caratterizzanti – discipline informatiche".</p> <p>By following the latest European Commission and national recommendations and guidelines on computational thinking and computing education, the course gives a general overview of scientific contents and computing technologies, which are relevant for tomorrow's citizens. The overall goal of the course is to <b>empower different students</b> to tackle a simple computational problem and develop a solution for it, critically and collaboratively.</p> <p>The specific objectives to achieve the goal are as follows.</p> <ol style="list-style-type: none"> <li>1) First, the course aims to provide participants with <b>basic knowledge of computing</b> to <b>understand</b> a basic computational problem, that is, to analyse it and abstract away what needed for developing a basic computing solution for it.</li> <li>2) Second, the course aims to enable students to <b>develop basic computing solutions</b> for different problems, which requires them to specify and program them.</li> </ol> <p>Third the course aims to enable students to <b>collaborate</b> in the analysis of problems and development of solutions, <b>with peers and/or Artificial Intelligent (AI)</b> agents/chatbots, and to <b>critically</b> reflect on what they are doing.</p>
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<b>Lecturer</b>	Rosella Gennari
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<b>Scientific sector of lecturer</b>	
<b>Teaching language</b>	English

<b>Office hours</b>	After each lecture, by prior appointment
<b>Lecturing Assistant (if any)</b>	
<b>Contact LA</b>	
<b>Office hours LA</b>	
<b>List of topics</b>	<ul style="list-style-type: none"> <li>• Introduction to: different computing devices, their hardware and software; computer organisation; data hierarchy; machine languages, assembly languages, high-level programming languages.</li> <li>• Introduction to programming conventions and paradigms, with a focus on the structured programming paradigm.</li> <li>• Introduction to a lean and efficient implementation of the Python programming language that is optimised to run on different and constrained computing devices.</li> <li>• Basic syntax and structure in Python: data types, variables, constants, operators, Boolean and arithmetic expressions; standard input/output handling;</li> <li>• Basic control flow structures, e.g., conditional control structures; error handling;</li> <li>• Basic data structures and subroutines, e.g., functions.</li> <li>• The above is tackled for covering the basics of computing to critically understand a computational problem and develop a resolution in a Python-based programming language, in collaboration with peers and existing AI technologies.</li> </ul>
<b>Teaching format</b>	In-presence, lecture and workshop-based.

<b>Learning outcomes</b>	<p><b>Knowledge and understanding:</b></p> <ul style="list-style-type: none"> <li>• Know fundamental principles of computing.</li> <li>• Know different models of computation and computing devices.</li> <li>• Have a basic knowledge of programming for different computing devices.</li> <li>• Have an understanding of how to efficiently interact with AI chatbot technologies to co-develop computing solutions.</li> </ul> <p><b>Applying knowledge and understanding</b></p> <ul style="list-style-type: none"> <li>• Be able to analyse basic computational problems.</li> <li>• Be able to specify one among many computational solutions.</li> <li>• Be able to program computational solutions.</li> <li>• Be able to understand computational solutions, developed in collaboration with other peers or AI technologies.</li> </ul> <p><b>Making judgements</b></p> <ul style="list-style-type: none"> <li>• Be able to collect and interpret useful data and to judge computational solutions and their applicability.</li> <li>• Be able to identify critical aspects in the development process and take a critical stance towards what is developed.</li> </ul> <p><b>Communication skills</b></p> <ul style="list-style-type: none"> <li>• Be able to describe and motivate their choices.</li> <li>• Be able to properly document a computing solution.</li> </ul> <p><b>Learning skills</b></p> <ul style="list-style-type: none"> <li>• Be able to learn how to critically approach AI technologies and techniques.</li> <li>• Be able to deepen their computing knowledge in autonomy and understanding the relevant literature.</li> </ul>
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<b>Assessment</b>	<p>Written: summative paper-based written exam, with questions.</p> <p>The total number of hours the student devotes to the course is #CFU * 25 (e.g., 150 hours for a 6 CFU course), including:</p> <ul style="list-style-type: none"> <li>○ the time spent in class;</li> <li>○ the preparation of the project;</li> <li>○ the time for independent study.</li> </ul>
<b>Assessment language</b>	English
<b>Assessment Typology</b>	Monocratic
<b>Evaluation criteria and criteria for awarding marks</b>	<p>The outcome is based on the answers to the written exam.</p> <p>Evaluation criteria, which are explained in details in class:</p> <ul style="list-style-type: none"> <li>• knowledge of the basics of computing,</li> <li>• understanding of the basics of computing,</li> <li>• ability to apply what learnt in the course,</li> <li>• ability to evaluate others' basic computational resolutions to given problems.</li> </ul>
<b>Required readings</b>	Material provided by the lecturer.
<b>Supplementary readings</b>	Online resources suggested by the lecturer, e.g., <a href="https://microbit-challenges.readthedocs.io/en/latest/introduction/letter.html">https://microbit-challenges.readthedocs.io/en/latest/introduction/letter.html</a>
<b>Software used</b>	Python, basic IDEs.