# COURSE DESCRIPTION – ACADEMIC YEAR 2023/2024

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| **Course title** | **Laboratory of Fundamentals of Programming** |
| **Course code** | 42612 |
| **Scientific sector** | INF/01 |
| **Degree** | Bachelor in Wood Engineering |
| **Semester** | 2 |
| **Year** | 1 |
| **Credits** | 3 |
| **Modular** | No |

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| **Total lecturing hours** | 30 (see related syllabus) |
| **Total lab hours** | 30 |
| **Attendance** | 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. |
| **Prerequisites** | Basics of mathematics. |
| **Course page** | Microsoft Teams, code communicated at the start of the course. |

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| **Specific educational objectives** | The course belongs to the type "caratterizzanti – discipline informatiche".<br><br>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 **empower different students** to tackle a simple computational problem and develop a solution for it, critically and collaboratively.<br><br>The specific objectives to achieve the goal are as follows.<br><br>1) First, the course aims to provide participants with **basic knowledge of computing** to **understand** a basic computational problem, that is, to analyse it and abstract away what needed for developing a basic computing solution for it.<br><br>2) Second, the course aims to enable students to **develop basic computing solutions** for different problems, which requires them to specify and program them.<br><br>Third the course aims to enable students to **collaborate** in the analysis of problems and development of solutions, **with peers and/or Artificial Intelligent (AI)** agents/chatbots, and to **critically** reflect on what they are doing. |

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| **Lecturer** | Rosella Gennari |
| **Contact** | POS building, Piazza Domenicani 3, 1st Floor, gennari@inf.unibz.it |
| **Scientific sector of lecturer** | |
| **Teaching language** | English |

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| **Office hours** | After each lecture, by prior appointment |
| **Lecturing Assistant (if any)** | |
| **Contact LA** | |
| **Office hours LA** | |
| **List of topics** | • Introduction to: different computing devices, their hardware and software; computer organisation; data hierarchy; machine languages, assembly languages, high-level programming languages.<br>• Introduction to programming conventions and paradigms, with a focus on the structured programming paradigm.<br>• Introduction to a lean and efficient implementation of the Python programming language that is optimised to run on different and constrained computing devices.<br>• Basic syntax and structure in Python: data types, variables, constants, operators, Boolean and arithmetic expressions; standard input/output handling;<br>• Basic control flow structures, e.g., conditional control structures; error handling;<br>• Basic data structures and subroutines, e.g., functions.<br>• 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. |
| **Teaching format** | In-presence, lecture and workshop-based. |

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| **Learning outcomes** | **Knowledge and understanding:**<br>• Know fundamental principles of computing.<br>• Know different models of computation and computing devices.<br>• Have a basic knowledge of programming for different computing devices.<br>• Have an understanding of how to efficiently interact with AI chatbot technologies to co-develop computing solutions.<br>**Applying knowledge and understanding**<br>• Be able to analyse basic computational problems.<br>• Be able to specify one among many computaional solutions.<br>• Be able to program computational solutions.<br>• Be able to understand computational solutions, developed in collaboration with other peers or AI technologies.<br>**Making judgements**<br>• Be able to collect and interpret useful data and to judge computational solutions and their applicability.<br>• Be able to identify critical aspects in the development process and take a critical stance towards what is developed.<br>**Communication skills**<br>• Be able to describe and motivate their choices.<br>• Be able to properly document a computing solution.<br>**Learning skills**<br>• Be able to learn how to critically approach AI technologies and techniques.<br>• Be able to deepen their computing knowledge in autonomy and understanding the relevant literature. |

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| **Assessment** | Prototype-based project, according to material and criteria explained in class by the teacher.<br><br>In case of a pass mark, the project will count for all 3 regular exam sessions.<br><br>The total number of hours the student devotes to the course is #CFU * 25 (e.g., 150 hours for a 6 CFU course), including:<br>○ the time spent in class;<br>○ the preparation of the project;<br>○ the time for independent study. |
| **Assessment language** | English |
| **Assessment Typology** | Monocratic |
| **Evaluation criteria and criteria for awarding marks** | The outcome is pass or fail.<br><br>Evaluation criteria, which are explained in details in class:<br>• ability to transfer what learnt to a novel context,<br>• creativity in ideating novel solutions,<br>• skills in critical thinking and peer-reflecting,<br>• ability to share and present what devised to others. |

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| **Required readings** | Material provided by the lecturer. |
| **Supplementary readings** | Online resources suggested by the lecturer, e.g., https://microbit-challenges.readthedocs.io/en/latest/introduction/letter.html |
| **Software used** | MicroPython or CircuitPython, basic IDEs. |