UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

## Information Technology - 1

**2627-3-E1801M032-T1**

### Learning objectives

The course aims to provide fundamental theoretical and practical knowledge in the field of Information and Communication Technology (ICT), offering valid support for everyday individual operations, fostering critical thinking, and developing awareness of the dynamics and challenges of digitalization.

Upon completion of the course, students will achieve the following expected learning outcomes:

Knowledge and understanding:

Understand the basic structure and architecture of a processing system (processor, memory, hardware, and software).

Know the principles of information representation (numeric and multimedia), Boolean algebra, and the fundamental concepts of algorithms.

Understand the basic concepts of computer networks, cybersecurity, cryptography, and digital signatures.

Applying knowledge and understanding:

Perform number base conversions, evaluate and simplify Boolean algebra expressions, and interpret simple algorithmic structures.

Apply core concepts of cryptography and IP addressing to simple operational problems.

Consciously use the main computer tools, online services, and security management pra

ctices.

Making judgements:

Critically evaluate cybersecurity issues and the validity/reliability of digital transactions (e.g., through the use of digital signatures).

Identify the most suitable ICT solutions to solve simple daily or academic operational problems.

Communication skills:

Express technical and scientific terminology accurately when discussing computer science, networks, and digital security.

Learning skills:

Develop an aptitude for self-directed learning and continuous independent updates regarding the rapid evolution of information and communication technologies.

## Contents

Basic concepts of information and computer science, computer operation, introduction to networks, it security.

## Detailed program

1. Introduction to computer science
2. Information representation
3. Software
4. System architecture
5. Processor
6. Boolean algebra
7. Algorithms
8. Networks
9. It security
10. Digital signature
11. Multimedia information representation
12. Exercises

## Prerequisites

Basic knowledge of mathematics and English language.
Verify the requirement to pass prerequisite courses, if required by the academic program. Otherwise, it will not be allowed by the systems and academic rules to take the exam

## Teaching methods

Traditional lecture.

The lessons are delivered in person starting from the first semester of 26-27, according to the schedule defined by the university.
Lessons will likely take place in a computer lab. Students will be able to access the available computers using their own credentials, although they are also free to use their personal devices.
Many sections of the curriculum combine theoretical concepts with practical exercises to help students become familiar with the tool. Study materials will be available on the e-learning platform.
The teacher occasionally likes to spice up lessons with spontaneous references and examples to facilitate understanding of the content.
However, attendance is not mandatory.

## Assessment methods

The exams will be held in person. It is unlikely that a computer lab will be available, so students are asked to bring their own laptop or tablet that can connect to the university's Wi-Fi. Smartphones are not suitable due to the small screen and difficulty in navigating between questions.
A multiple-choice questionnaire will be implemented using a dedicated platform, a website called Questbase. It is a timed test. The platform allows traffic monitoring. Students who are regularly registered for the exam will receive written confirmation from the teacher with some instructions related to the test and the link to access the platform. No installation is required by the student, who still has control of the device.
During the test, students will receive an access password. It is a website, and it should be treated as such. The management of the test, moving from one question to another, and vertical scrolling are at the student's discretion. The timed test lasts 38 minutes in the form of a multiple-choice questionnaire. 30 questions, 1 point for each correct answer, 0 for all other cases. The questions and answers are randomly drawn from a predefined pool, and the teacher does not know them in advance. The test is strictly individual.
The results are consequential to the submission of the test. Press the Submit button at the bottom of the page to transmit the answers and view corrections and results. If time does not allow submission, the test will still be considered valid and evaluated by the system for what has been done up to that point.
The website requires the entry of name, surname, and student number immediately after entering the password. As always, it is useful to have an identification document handy.
There may be small, simple exercises: base conversion, Boolean algebra, algorithms, cryptography, IP. As per the material available on the e-learning platform. It is allowed to use a pen and paper. No demanding calculations are expected, and they are limited to the provided options.
No software is required other than the browser. Overall, it is always advisable to have different browsers available on your device.

The instructor can monitor submissions in real time but not the responses.
Only when the system is unlocked can they access and download the data required for evaluations. In such cases, it is also possible to send a PDF report to students who request it, containing the results of the questions. In addition to viewing their score, students may choose to review the detailed responses by going over the questionnaire.
Once finished, or alternatively, they may close the browser and exit the session.
No assessment tests are scheduled outside the dates set by the university.
The questionnaire format, in its agreed form and timing, is considered suitable for assessing the objectives of this course.
Multiple-choice questions can measure specific knowledge.
The proposed options allow students to logically evaluate the available choices. Text comprehension sharpens reasoning skills.
The questions are divided into two types:

1. Theoretical and conceptual questions: aimed at assessing knowledge and understanding regarding architecture, software, networks, security, and digital signatures.
2. Application questions / short exercises: aimed at verifying the ability to apply knowledge and understanding through quick calculations and practical problem-solving (e.g., number base conversions, Boolean algebra expressions, algorithm tracing, IP address calculations, and cryptography).

## Textbooks and Reading Materials

The teacher uploads study materials and video recordings to the e-learning platform. No reference texts are indicated. The student, if they wish, can use any information source.

## Semester

First semester. According to the schedule defined by the university.
For a total of 42 hours.

## Teaching language

Italian.

## Sustainable Development Goals

NO POVERTY