



UNIVERSITÀ  
DEGLI STUDI DI MILANO-BICOCCA

## SYLLABUS DEL CORSO

### Informatica Generale - 2

2021-2-E1802M033-T2

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#### Learning objectives

The course presents the basic concepts of modern computer science, the structure and evolution of the automation systems. Aspects of information technology applied on financial and economic field will be illustrated.

#### Contents

Introduction to Computer Science, Hardware, Software, computer networks, concept of algorithms and some elements of program languages and Python

#### Detailed program

Introduction to Computer Science: historical development of the modern (or present kind of) computer and its predecessors (or the old type). Definition of computer science and the concept of information. Computer architecture.

Information and the digital representation: Numerical systems: decimal, binary, octal and hexadecimal. Bit and Bytes. Representation of integer numbers. Conversions between numerical systems. Representation of signed integer numbers. Complement. Binary arithmetic. Floating-point representation. IEEE standard. ASCII code. Boolean algebra: logical functions and expressions.

Hardware: functional analysis of the structure of a computer. The Von Neumann machine: Central Processing Unit (CPU), the input/output system, the bus, computer data storage, input and output devices. Analog and digital. RAM and ROM memories. Peripherals communication. Moore's law. I/O devices: keyboard, pointing devices, text and graphical input. Pixels and screen resolution. Secondary memories: optical, magnetic, and optical-magnetic.

Software: the fundamental software (operating system, drivers, utilities) and the application software (personal productivity and more...). Databases. Elements of database.

Computer networks: local area networks, wide area networks, client-server and peer to peer models. Protocols of networks, an application protocol: the HTTP. The World Wide Web, some elements of HTML. Network applications. The Internet. TCP/IP protocol. Synchronous and asynchronous communication. Broadcast, multicast and point-to-point communication. Client-server architecture.

The concept of domain. DNS. The web. Elements of HTML. Internet of Things (IoT). Cloud computing.  
Algorithms and Programming: how to define an algorithm, structured programming. Elements of the Python language.

## Prerequisites

Mathematical-logical knowledge as acquired during high-school.

## Teaching methods

Frontal lessons

During the Covid-19 emergency period, lessons will be held remotely in asynchronous mode.

## Assessment methods

Learning assessment includes a written exam and possibly an oral exam. The written exam will take place in the teaching laboratories with multiple choice questions and essay questions.

It is possible to pass the exam even with the single vote of the written exam.

In the Covid-19 emergency period exams will only be online. Oral exams will be carried out using the WebEx platform. On the e-learning page of the course there will be a public link for access to the examination

## Textbooks and Reading Materials

D. Mandrioli, S. Ceri, L. Sbattella, P. Cremonesi, G. Cugola: Informatica arte e mestiere. McGraw Hill, IV edizione;  
J. Glenn Brookshear, D. Brylow: Informatica: Una panoramica generale XII ed. Pearson eds  
Cay S. Horstmann, Rance D. Necaise Concetti di informatica e fondamenti di Python ed. Apogeo

## Semester

Second semester

## Teaching language

Italian

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