



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Fundamentals of Computer Science for Communication

2425-1-E2004P036

Learning area

1: Study of the means by which communication takes place.

Learning objectives

The educational goals of this teaching are practical-applicative and conceptual-theoretical in nature. In detail:

- Structure and operation of computers.
- Elements of operating systems, communication and telematic networks.
- Use of the main Office Automation applications and data management.
- Concepts of Search Engines, Data Compression, Collaboration Tools and Files and Formats.
- Elements of generative artificial intelligence.
- Basic knowledge and use of a Content Management System (CMS) for creating thematic blogs.

The teaching is aimed at providing basic knowledge and skills in the area of some commonly used computer tools and technologies. Basic principles of computing and electronic computers, elements of operating systems, communication and telematic networks, office automation tools, information access, files and their commonly used formats, data compression, collaboration tools and elements of generative artificial intelligence will be provided. Technological aspects will first be introduced and then gradually deepened to enable informed use and to stimulate insights to be explored at the individual level.

Contents

The following topics will be covered within the teaching: the computer as a solver; basic computer science,

elements of operating systems, communication and telematic networks, search engines, files and formats, data compression, tools for cooperation, word processors, spreadsheets, slideshows, elements of conversational artificial intelligence, tools for creating online content (blogs).

Detailed program

Introduction to the course

The computer as solver:

- Computer science and information
- Algorithms
- Computability

Basic Computer Science:

- Binary system and information representation
- Hardware and software
- Organization of computing systems
- Bus
- Main and secondary memories
- Terminals

Communication and computers:

- Computer networks
- Protocols and layers
- Signal transmission and transmission media
- The telephone network

Operating systems:

- Structure of an operating system
- Processes and process scheduling
- Memory management (virtual memory, paging and segmentation)
- File systems

Search engines:

- Structure of the Web
- Searching for information
- Structure of a search engine
- Indexing, TF-IDF
- Page-Rank
- SEO and SEM
- Recommender systems
- Tips & Tricks

Files and Formats:

- Recalls of file systems
- Main proprietary and non-proprietary formats

Data compression:

- Lossy and lossless compression
- Main techniques
- Main compression tools

Elements of conversational artificial intelligence:

- Objectives and approaches
- Basic assumptions
- Models of development and reasoning
- Weak and strong artificial intelligence
- Chatbots and virtual assistants
- CASA theory
- Generative AI
- Generative AI and imaging

Office Automation:

- Word processors
- Spreadsheet
- Slideshow

Collaboration tools

Prerequisites

The course does not require prerequisites.

Teaching methods

The type of teaching activity is partitioned between lectures and laboratory. The didactic mode of theoretical lectures consists of 21 in-person lecture-based classes of 2 hours each one and 8 in-person laboratory interactive-classes of 2 hours each one.

The topics covered will be presented in face-to-face lectures in relation to theoretical and methodological aspects, practical examples will be discussed with the aim of stimulating appropriate reflection and awareness of use in students. The course has in part a laboratory setting: students are, in fact, asked to create a Web blog by experimenting independently with the use of a Content Management System to create thematic blogs.

Assessment methods

The learning evaluation will be through a written test, containing both open-ended questions and closed-ended tests. A project consisting of a thematic Web blog created in groups (2 people) is also due.

There are no ongoing tests.

The evaluation of the written assignment, which will focus on the topics covered during the lectures, will be in thirtieths and will affect 2/3 of the final grade;

The evaluation of the project will be in thirtieths and will affect 1/3 of the final grade.

Examination and evaluation methods will be explained during the first lecture.

Textbooks and Reading Materials

- Slides used in face-to-face lectures or their summaries, possibly containing links to relevant in-depth material on the Web. In addition, articles and references for suggested thematic insights may be pointed out.
- Lecturer's Notes.

Sustainable Development Goals

DECENT WORK AND ECONOMIC GROWTH | INDUSTRY, INNOVATION AND INFRASTRUCTURE
