UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Fundamentals of Computer Science for Communication

2324-1-E2004P036

Learning area

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

Learning objectives

The formative objectives of this teaching are practical-applicative and conceptual-theoretical in nature.
More in detail:
• Structure and functioning of computers
• Elements of operating systems, communication and telematic networks
• Use of the main Office Automation applications and data management
• Elements of generative artificial intelligence
• Basic knowledge and use of WordPress and the main plugins for creating a thematic blog.

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 but also appropriate insights to be developed at the individual level; some functional and usage aspects will be explored.

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
o Computer science and information
o Algorithms
o Computability

• Basic Computer Science
o Binary system and information representation
o Hardware and software
o Organization of computing systems
o Bus
o Main and secondary memories
o Terminals

• Communication and computers
o Computer networks
o Protocols and layers
o Signal transmission and transmission media
o The telephone network

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

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

• Files and Formats
o Recalls of file systems
o Main proprietary and non-proprietary formats

• Data compression
o Lossy and lossless compression
o Main techniques
o Main compression tools

• Elements of conversational artificial intelligence

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

• Office Automation
o Word processors
o Spreadsheet
o Slideshow

• Collaboration tools

Prerequisites

The course does not require prerequisites.

Teaching methods

The topics covered will be presented in lectures in relation to theoretical and methodological aspects but also discussed in relation to practical examples and case studies. The course has in part a laboratory setting: students are, in fact, asked to create a blog by experimenting autonomously with the use of thematic plugins.

Assessment methods

The verification of learning will take place through a written assignment, and the group (3 people) realization of a thematic Web site, the realization of which should start during the teaching (in particular, the idea will be publicly presented, and some aspects related to the practical realization of the site).

• The evaluation of the written assignment, which will cover the topics covered during the lectures, will be in thirtieths;
• The evaluation of the Web site is a group one, and will be in thirtieths.
• The overall grade, in thirtieths, will be an average of the grade obtained in the written assignment and the overall grade obtained for the thematic Web site.

Examination and evaluation methods will be explained during the first lecture of the Web Tools and Applications teaching.

Textbooks and Reading Materials

Slides used in face-to-face lectures, 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