UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Fondamenti di Informatica per la Comunicazione

2526-1-E2006P001

Learning area

3. Techniques, tools, and technologies of communication.

Learning objectives

Knowledge and Understanding

- This course aims to provide students with knowledge and skills related to the main tools and information technologies underpinning many modern communication techniques. The educational path offers an overview ranging from the fundamentals of computer operation to the most recent innovations in artificial intelligence. Technological content will be introduced progressively and with increasing depth, in order to foster a conscious use of digital tools and to encourage further individual study.

Applying Knowledge and Understanding

- Practical use of common software applications, including office automation tools, search engines, compression algorithms, and online collaboration platforms.
- Creation and management of a themed blog using WordPress, including the use of key plugins.

Autonomy of Judgment

- The course is designed to develop students' independent judgment and critical analysis skills in the use of information technologies. These competencies will also be fostered through case study discussions and hands-on lab activities.

Communication Skills

- Development of the following competencies:
  i) the ability to communicate technical content, ideas, problems, and solutions clearly, consciously, and unambiguously to various types of audiences;
  ii) the ability to work effectively in a team, sharing goals and problem-solving strategies.
  These skills will be assessed both during exams and through independent project work carried out as part of the laboratory activities.

Learning Skills

- The course structure is designed to provide both theoretical knowledge and practical skills, offering a solid foundation for further study of the functioning and application of digital tools. The training provided effectively prepares students for independent continuation of their education in master's programs focused on the technical and informational aspects of communication. The learning skills developed will be assessed through examinations and through the level of independence and competence demonstrated in laboratory work.

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 educational activity is divided between lectures and laboratory sessions. The theoretical lectures consist of 21 two-hour classes delivered in expository teaching mode (DE), including 19 in-person sessions and 2 held remotely. Additionally, there are 8 two-hour laboratory activities conducted in interactive teaching mode (DI), of which 7 are held in person and 1 remotely.

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.

Assessment Criteria and Grading Scale

- **30** with honors (30 e lode): Excellent performance, demonstrating complete, in-depth, and fully accurate knowledge, accompanied by highly developed critical thinking and argumentative skills.
- **30**: Outstanding performance, with extensive, well-structured, and correctly expressed knowledge, enriched by significant critical insights.
- **27–29**: Good performance, showing a solid and overall satisfactory understanding of the subject, with clear and generally accurate exposition.
- **24–26**: Fair performance, with knowledge covering the essential aspects but not fully developed or consistently structured.
- **21–23**: Sufficient performance, with partial and occasionally superficial knowledge; the general framework of the discipline is understood, but the exposition shows weaknesses in clarity and coherence.
- **18–20**: Barely sufficient performance; knowledge is limited and fragmented, with inconsistent understanding of key topics. The expression is weak, with notable gaps.
- **Below 18**: Insufficient performance; knowledge is severely lacking or absent, with an inability to navigate the subject matter and serious difficulties in structuring and expressing ideas.

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