UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Web Tools and Applications

2627-1-F9202P003-F9202P00301

Aims

The educational objectives of this teaching are practical-applicative and conceptual-theoretical in nature.

Knowledge and Understanding

This course aims to provide students with knowledge and skills related to the main tools and information technologies used in Web application development. The teaching path offers an overview that begins with the creation of the Internet and the Web and continues through to the most recent developments, and elements of artificial intelligence. Technological aspects will first be introduced and then explored in greater depth, allowing students not only to use Web tools effectively, but also to pursue individual areas of interest more thoroughly. The course will focus on functional and user-oriented aspects, as well as on selected market dynamics within the Web ecosystem.In addition, the course will examine the features of the most popular social media platforms and of the mobile Web technologies, “and aspects related to artificial intelligence were introduced.

Applying Knowledge and Understanding

Knowledge and understanding of the underlying dynamics of the most relevant technical, applicative, and economic aspects of the Web.

Autonomy of Judgment

The course aims to foster autonomy of judgment and critical thinking in the use of information technologies. These skills will be developed through the analysis and discussion of case studies.

Communication Skills

Development of the ability to communicate technical content, ideas, problems, and related solutions clearly, effectively, and unambiguously to different audiences. These skills will be assessed during the examination process.

Learning Skills

The degree program is structured to provide both theoretical knowledge and practical skills, establishing a solid foundation for further exploration of the functioning of digital tools and applications. The proposed training effectively prepares students to pursue further studies independently into the Master's degree programs with a focus on technical and computer science-related topics. The learning skills acquired will be assessed through examination activity.

Contents

The course will cover the following topics: computer networks and network protocols (basic concepts, local area networks, wide area networks, the Internet); the Web, its standards, and Web languages (differences between Internet and Web, the Web's graph structure, static Web/dynamic Web, semantic Web, main languages and meta-languages); Web browsers, their history, and main features; major Web services and applications; social media (and the social Web); issues of privacy and data security on the Web; elements of artificial intelligence and Web economy, Web feed and feed readers.

Detailed program

Introduction to computer networks and network protocols

- Basic concepts
- Local area networks
- Geographic networks
- The Internet
- Networking protocols
- The Web and Introduction to its Standards

The Web and introduction to its standards

- Difference between the Internet and the Web
- The graph structure of the Web
- Static Web/dynamic Web (and paradigms Web 1.0, Web 2.0)
- Semantic Web (Web 3.0 paradigm)
- Social Web
- Web app

Security and confidentiality on the Web

- Cryptography
- Cookies
- Malware
- Proxies
- Referral links

Web browsers, history and role

- Introduction
- Interfaces

- Evolution
- Impact

Introduction to technologies and languages for generating Web applications

- HTML
- CSS
- DOM
- XML

Artificial intelligence

- Objectives and approaches
- Main techniques
- Generative artificial intelligence
- Language and Computers
- Natural Language Processing (NLP) and Natural Language Generation (NLG)
- Aspetti legali

Information access

- Search engines
- Recommender systems
- Web feed and feed readers

Hints of SEO, digital marketing, and digital economy

- Optimization of on-page and off-page content
- Some Tools for SEO

Social media

- Introduction
- Graph theory
- Complex network theory
- Social Network Analysis (SNA) metrics

Prerequisites

The course assumes that the students have a certain familiarity with main web access tools (browsers and search engines). A basic familiarity with the most widely used social media platforms (at least Facebook, Twitter, YouTube) is desirable..

Teaching form

The type of educational activity is divided between lectures and laboratory sessions. The theoretical lectures consist of 21 two-hour classes delivered in both expository and interactive teaching mode, including 17 in-person sessions and 4 held remotely.

Theoretical and methodological aspects will be presented along with practical examples and case studies, employed to exemplify the introduced topics. The course has a partly laboratory approach: students are asked to autonomously experiment several online applications, among the most diffused, and to build a personal presence on different social media.

Textbook and teaching resource

Slides of the frontal lessons, which will include links to additional suggested material (papers, articles, blogs).

Semester

First semester.

Assessment method

The **Strumenti e Applicazioni del Web** module is part of the **Tecnologie e Persone nel Web** course.

The final grade for **Tecnologie e Persone nel Web** is awarded only after both modules have been successfully completed: **Strumenti e Applicazioni del Web** and **Principi di Psicologia Sociale per il Web Design**.

The overall assessment is therefore based on a written exam, related to the **Strumenti e Applicazioni del Web** module, and a project, which refers to both modules.

Regarding the **WRITTEN EXAM**:

- It will last 120 minutes and will include a series of closed-ended questions (multiple-choice) and open-ended questions. Specifically, it will include 10 multiple-choice questions (1 point each) and 4 open-ended questions (5 points each). The questions will be aimed at assessing the actual acquisition of theoretical knowledge and the related ability to apply it. The assessment criteria for the written exam are: correctness of the answers, ability to argue, summarize, create connections, and critically interpret phenomena.
- The assessment will be expressed out of thirty and will be based on the following criteria:
  ** 30 cum laude: Excellent performance, characterized by complete, in-depth, and fully correct knowledge, accompanied by a very high level of critical and argumentative ability.
  ** 30: Excellent-level exam, with broad, well-structured knowledge expressed correctly and enriched by significant critical insights.
  ** 27–29: Good exam, demonstrating an overall solid and satisfactory understanding of the subject, with clear and generally correct exposition.
  ** 24–26: Fair exam, in which knowledge is present in its fundamental aspects, but not fully developed nor always coherently articulated.
  ** 21–23: Sufficient exam, with partial and sometimes superficial knowledge; the general framework of the discipline is understood, but the exposition shows shortcomings in clarity and argumentative coherence.
  ** 18–20: Barely sufficient exam; knowledge is limited and fragmentary, with an uneven understanding of the main topics. Expression is weak and contains even significant gaps.
  ** Below 18: Insufficient exam; very limited or absent knowledge, inability to navigate the discipline, and serious difficulties in organizing and expressing thought.

Regarding the **PROJECT**:

- It will consist of developing a group project work (groups of 3 students for the creation of a complete and navigable website, moodboard, wireframes, and mockups).
- There will be an assessment component related to the topics covered during the practical classes of Strumenti e Applicazioni del Web (max. 15 points) (possible cum laude awarded for this part of the project if particularly well done).
- There will be an assessment component related to the topics covered during Principi di Psicologia Sociale per il Web (max. 15 points) (possible cum laude awarded for this part of the project if particularly well done).
- Maximum achievable grade: 30/30.

Regarding the **OVERALL ASSESSMENT (Tecnologie e Persone nel Web)**:

- It will be expressed out of thirty and will be an average between the grade obtained in the written exam and the overall grade obtained for the thematic website.
- Cum laude in the overall assessment is awarded if the maximum score is obtained in each of the 3 parts and cum laude is awarded in at least one of the three parts.

Office hours

By appointment.

Sustainable Development Goals

DECENT WORK AND ECONOMIC GROWTH | INDUSTRY, INNOVATION AND INFRASTRUCTURE