UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

# COURSE SYLLABUS

# Web Applications: Design and Development

**2526-2-F9201P215**

## Aims

The main teaching objectives are:

1. To provide a solid foundational knowledge of web technologies, including HTML, CSS, and JavaScript.
2. To introduce advanced front-end development concepts using React, focusing on component-based architecture, state management, and hooks.
3. To equip students with skills in managing styles through libraries such as Reactstrap and integrating external APIs via specific examples.
4. To familiarize students with modern development practices, including version control with Git/GitHub, interaction with RESTful APIs, and MVC architecture.
   In addition to specific knowledge and skills, the course aims to support the development of independent judgment and the ability to learn through ongoing project activities and optional deep-dive tasks for extra credit. This approach also seeks to facilitate the development of communication skills, particularly in documenting and discussing completed work.

## Contents

1. Web Application Foundations: Learn the basics of developing web applications, including essential technologies like HTML, CSS, and JavaScript for building interactive user interfaces.
2. React Fundamentals: Dive into React to understand components and state management, enabling dynamic and responsive web experiences with advanced front-end development techniques.
3. Advanced React Techniques: Master routing, conditional rendering, and context API in React, along with managing visual styles using libraries like Reactstrap for more sophisticated user interfaces.
4. Modern Development Practices: Gain skills in server interaction through JSON and HTTP, understand the MVC design pattern, and adopt modern tools and practices such as Git/GitHub for version control and RESTful APIs integration.

## Detailed program

- Basics of web application development
- JavaScript for interactive web applications
- Fundamentals of React
- Components and state management in React
- Management of visual styles in React
- Routing, conditional rendering, Context API
- MVC design pattern
- Server interaction with JSON and HTTP
- Modern development tools and practices

## Prerequisites

The course is designed for second-year students of Theory and Technology of Communication (TTC), and it requires:

- Basic knowledge and skills in the web domain
- Fundamentals of programming

## Teaching form

The course will be delivered through a combination of lectures and hands-on labs.

Lectures focus on theoretical understanding and are accompanied by practical labs to reinforce learning.

Students will engage in project work, particularly the To-do List app throughout the course, which will be incrementally built upon each week.

This structured approach ensures that students gain both theoretical knowledge and practical skills essential for web development using modern technologies.

## Textbook and teaching resource

Slides and further materials shared by the teacher. A reference book for React is currently being selected.

## Semester

First semester

## Assessment method

Written and optional oral examination on topics discussed during the course; knowledge about concepts, techniques, issues discussed in the course, as well as the ability to solve exercises proposed, and the ability to choose solutions based on their appropriateness to the context of the problem will also be evaluated. The ability to convey knowledge and abilities in a compact and effective way will be appreciated. For the laboratory part of the cvourse, active participation of students will be assessed. An optional group project (2-3 members) will be proposed; a single possibility to carry out the project will be defined, plausibly close to the end of the course, with assignment due in the months of January/February. It could lead to extra points for the final evaluation, provided the project is discussed.

## Office hours

Wednesday morning, by appointment, potentially also via teleconferencing systems.

## Sustainable Development Goals

INDUSTRY, INNOVATION AND INFRASTRUCTURE