

year	code	course name	ECTS	type	semester	educational activity type	ECTS	hours	faculty
2	F1801Q124	DISTRIBUTED SYSTEMS TECHNOLOGIES AND APPLICATIONS	6	optional	first semester	lecture	4	32	De Paoli Flavio
						laboratory	2	24	

CV: <http://www.unimib.it/go/176181440>

**Contents** Current distributed applications exploits the Web as a reference platform, and the concept of service as a metaphor for building independent components that implement the requested functionalities. This course studies the emerging distributed software technology principles and models, and their impact on "Cloud Computing" and "Internet of Things" (IoT) applications. The evolution of interaction and communication paradigms in this new scenario will be analyzed. The course includes a part devoted to the close examination of the technologies to microservizi and container with reference to Docker with practical exercises.

**Course objectives** The goal of the course is to provide students with fundamental elements to understand and design collaborative and service-oriented Web applications. After the course, students will master the most important models for distributed systems based on Web technology, and the basic characteristics of languages and tools for their development. They will be able to analyze and design applications based on microservices and Docker technology.

**Prerequisites** Thorough comprehension of networking and distributed system principles to design and develop distributed applications; anyway the introductory part of the course will recall the basic concepts.

**Teaching methods** The course includes theoretical and exercise lectures integrated with individual study activities with e-learning support

**Learning assessments** Learning assessment will occur by written questioners with open and close questions with oral discussion.

### Extended Syllabus

- Introduction. Evolution of the Internet and the Web: network, devices and applications convergence. Recall of basic communication principles with Internet and the Web; The HTTP protocol and Web applications (Servlet/JSP). The REST (Web API) architectural style: Web of Services, Web of Data, and Web of Things.

## Master of Science in Computer Science a.a. 2017-18

- Service-oriented systems: Definition of service and service model; service oriented architecture (SOA); Service Science: business processes and design alternatives; Principles and models of Cloud and Fog computing and their impact on organizations and design of business solutions: system-of-record and system-of-engagement models. Principles and technology for systems of engagement: mobility and Ajax active interfaces.
- Information exchange: overview of format syntax and semantics (XML, JSON, Linked Data, RDF). Service and data source descriptions and annotations: functional, non-functional and behavioral properties. Automatic service discovery and composition (mashup) of services.
- Service-oriented architectures for "smart" ecosystems: smart city, smart building, smart mobility, etc. Interoperability principles for IoT and other types of systems.
- Design and development of applications based on microservices with Docker container technology. Principles of monitoring, deployment at scale e security.