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# Multimedia systems

## Finalità

The course offers an introduction to Multimedia Systems, presenting the main coding and compression techniques for multimedia signals, the issues of synchronization, and the main application contexts. Particular attention will be devoted to the problems and techniques for IP/Internet based multimedia systems.

## Programma

Introduction to the course. Multimedia and reference standards.

Coding and compression techniques for Audio/Video signals  
Digital Audio and Video. MPEG and AAC audio coding. ISO MPEG-1 and MPEG-2 video coding.  
MPEG-4 video and advanced profiles: Fine Grain Scalability profile.  
Additional coding techniques.

Synchronization of multimedia streams. XML, SMIL, X3D languages.

Protocols for IP multimedia  
UDP, Multicast. RTP and RTCP.  
Real-Time Streaming Protocol. SDP. SIP.

Network issues and Quality of Service  
Application-level QoS control. Error resilience.  
Layered coding. Forward Error Correction. Rate-adaptive techniques. QoS.

Architectures for Multimedia Systems  
Classification. Server architecture: I/O and storage. O.S. real-time support.  
Modeling and performance evaluation.

Multimedia tools and applications  
VideoConferencing, VoIP, Content Delivery Networks, Digital libraries. Content-based retrieval.  
Examples of significant cases.

## Attività d'esercitazione

Lab exercises about coding and compression techniques for digital systems and synchronization of multimedia streams  
Lab exercises about protocols and multimedia applications.

## Modalità d'esame

Evaluation of student assignments .  
Oral exam.

## Testi consigliati

Lecture notes and papers provided by the teacher.