



# UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

## INTERNET AND MULTIMEDIA

<b>Anno immatricolazione</b>	2020/2021
<b>Anno offerta</b>	2021/2022
<b>Normativa</b>	DM270
<b>SSD</b>	ING-INF/03 (TELECOMUNICAZIONI)
<b>Dipartimento</b>	DIPARTIMENTO DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE
<b>Corso di studio</b>	COMPUTER ENGINEERING
<b>Curriculum</b>	Computer Science and Multimedia
<b>Anno di corso</b>	2°
<b>Periodo didattico</b>	Primo Semestre (27/09/2021 - 21/01/2022)
<b>Crediti</b>	6
<b>Ore</b>	46 ore di attività frontale
<b>Lingua insegnamento</b>	English
<b>Tipo esame</b>	ORALE
<b>Docente</b>	FAVALLI LORENZO (titolare) - 6 CFU
<b>Prerequisiti</b>	General knowledge of protocols. Basic knowledge of mathematical concepts of transform and digital signal processing.
<b>Obiettivi formativi</b>	<p>The objective of the course is to give to the students the elements to understand the principles behind the various standards (both for codec design and transport protocols) so that they will be able to understand performance and requirements.</p> <p>At the end of the course, it is expected that the student will know</p> <ul style="list-style-type: none"><li>- Concepts of information and compression</li><li>- Techniques to achieve a tradeoff between compression and user-perceived quality</li><li>- The characteristics of a modern telecommunications network</li><li>- Network architecture and protocols for content distribution networks.</li></ul>
<b>Programma e contenuti</b>	Source coding

Basic Information Theory. Understanding the meaning of "information content" allows the implementation of compression techniques that remove any unnecessary redundancy. We go through the main definitions and properties of information and entropy and then discuss how efficient codes may be generated. Lossless and lossy coding techniques.

Perceptive coding techniques, prediction, transform coding.

Audio and video standards

Description of audio (PCM, ADPCM, vocoders, MP3) and video (Jpeg, H.26\*, MPEG\*) coding standards concerning both the aspects of strict coding layer and to the transport layer with file formatting for transmission.

Internet basics

History, structure and protocols

Routing algorithms and their properties: Djikstra and Distance Vector Routing protocols (IGP/BGP, OSPF).

Upper layers in IP model

Quality of service in telecom networks

Older systems: How previous circuit- and packet-based networks dealt with quality, congestion, service management (PSTN, ATM, Frame Relay)

Basic introduction to traffic characterization and management.

Scheduling algorithm, admission and usage control. Scheduling algorithms

IP-QoS: IntServ, DiffServ models

MPLS

Protocols for multimedia over IP: RTP, SIP, HTML. DASH

Platforms: Content distribution networks, P2P

#### Metodi didattici

Class talks given with the support of slides and integrated with the use of blackboard for specific topics.

#### Testi di riferimento

Slides, Links, selected papers and book chapters all referenced in during lessons.

#### Modalità verifica apprendimento

Oral exam. The students are offered the opportunity to select a topic to study in dept and provide a presentation. Such presentation wil not replace the exam but will be an integral part of it.

#### Altre informazioni

#### Obiettivi Agenda 2030 per lo sviluppo sostenibile

[Gli obiettivi](#)