



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Telecommunication Systems and Services

2021-1-F1801Q129

Aims

Provide the notions necessary to understand the main network design and management issues, in the multimedia communication, data center and cloud environments

Contents

Queuing theory and reliability basics, reti di accesso a larga banda, voce e multimedialità su IP, apparati di networking, reti dei Data Center, Software Defined Networking, gestione delle reti; nuove reti mobili (4G e 5G) per IoT/M2M

Detailed program

- 1 "Queuing theory and reliability basics
 - general models of a service system, M/M/1 and M/D/1 queues
 - pure loss systems
 - reliability, MTBF, MTTR and availability
 - availability of series and parallel configurations"
- 2 "Broadband Access Networks

- fiber/copper architectures

- fiber access

- wireless access"

3 "Voice and multimedia over IP

- the audio signal, waveform coding, advanced coding techniques, the video signal

- network delay components and overhead

- SIP architecture

- VoIP/TDM interworking, SBC

- example of VoIP supplementary services"

4 "Networking devices

- router functionality and high availability configuration

- front-end architectures, firewall, IDS and load balancer"

5 "Data Center networking

- Data Center design principles

- RTO/RPO and disaster recovery techniques

- Virtual Data Center and Cloud Computing"

6 "Software Defined Networking

- SDN basics

- the Openflow protocol

- NFV"

7 "Network Management

- network configuration/Netconf

- fault management and SNMP

- management network architecture"

8 "4G and 5G mobile networks"

Prerequisites

Basic notions of TCP/IP networking

Teaching form

Classroom lectures and exercises

The course will be held in italian, except for the terms in english, which will remain in english

During the Covid-19 emergency period, the teaching form is changed. Lectures and exercises will be mostly delivered remotely with video recordings and with live videoconferencing events.

Textbook and teaching resource

On-line material on the course site

Semester

second semester

Assessment method

The assessment is carried out through a written test that includes both open questions on the topics of the course, in which a detailed description of one of the problems addressed is requested, and numerical exercises concerning aspects of network sizing, performance and reliability.

The test structure always includes both types of questions; normally there are two open questions, each Worth 30% of the final grade, and two exercises that account for 20% each.

Office hours

Monday morning by appointment
