UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Telecommunication Systems and Services

2122-1-F1801Q129

Aims

Provide the notions necessary to understand the main network design and management issues, in the multimedia communication, enterprise connectivity and mobile radio networks (from 2G to 5G)

Contents

Wired and wireless broadband access networks, WAN connectivity, software-defined networking, voice and multimedia over IP, quality of service in networks, content delivery networks, mobile radio networks (4G and 5G), network management

Detailed program

1) Broadband Access Networks:

- Fiber/copper architectures;

- Fiber access;

- Wireless/satellite access.

2) WAN connectivity:

- Generalized and dedicated connectivity;

- MPLS protocol.

3) Software Defined Networking and Network Function Virtualization:

- Legacy router and switch architecture;

- Firewall, IDS and load balancer architecture;

- Basic principles of SDN;

- OpenFlow protocol;

- Basic principles of NFV.

4) Voice and multimedia over IP:

- The audio signal, waveform coding and advanced coding techniques;

- Network delay components and overhead;

- SIP architecture.

5) Internet quality of service:

- Service Level Agreement and Traffic Conditioning Agreement;

- Policing, shaping and marking techniques;

- Techniques for QoS guarantees (IntServ, DiffServ).

6) Content delivery networks:

- Principles;

- Architecture and techniques.

7) Mobile radio networks:

- Basics on cellular architectures;

- Radio planning;

- 2G (GSM and GPRS);

- 3G (UMTS and HSPA);

- 4G (LTE);

- 5G.

8) Network management:

- Network configuration and failure management;

- Architecture and protocol of management 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

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 quality of service

Office hours

Monday morning by appointment