

# TCN 6122 Local Access and Internet Telecommunication Engineering

**Credits:** 3 credits

**Textbook, Title, Author, and Year:** P.S. Neelakanta and D. Baeza, Next-generation Telecommunications and Internet Engineering, (Linus Publications Inc., New York, NY: 2009)

**Reference Materials:** P.S. Neelakanta: A Textbook on ATM Telecommunications (CRC Press, Boca Raton, FL: 2000); A. Z. Dodd: The Essentials guide to Telecommunications (Prentice Hall PTR Upper Saddle River, NJ: 2002)

## Specific Course Information

**Catalog Description:** Concepts of local-access (local-loop) and Internet engineering: State-of-the-art telecommunications (wireline and wireless). Perspectives of architectures and integrated services. Design issues: QoS, streaming of packetized voice, data and video through locals-loops and core networks. Internet economics

**Prerequisites:** EEL 4512 (Communication Systems) **or** EEL 4519 (Telecommunication Engineering) **or** knowledge on LAN, B-ISDN, Networking, Data Communications **and/or** Basic Communication Systems/Telecommunications (with Instructor's permission)

**Specific Goals for the Course:** This course is designed to introduce the state-of-the-art aspects of local-loop access and Internet engineering and their future trends. Practical considerations will be emphasized and real-world examples will be addressed. Both theoretical basis and engineering relevance of local-access, core ATM/MPLS/VPN-specific WAN transports of triple (voice/data/video) services and new generations of wireless systems (cdmaOne and cdma2000) will be deliberated. Technoeconomics will be emphasized on Internet/VoIP pricing etc. Deregulation and security implications will be indicated.

## Brief List of Topics to be covered:

1. Infrastructure of telco networks (wireline and wireless) – Local access and core architecture
2. Coexistence of incumbent and competitive local exchange carriers and ISPs: CO engineering design
3. Technology perspectives of telephony, dial-up modem, xDSL and wireless local-access: Physical layer considerations at local-loop: Copper, fiber (active/passive) networks, PON/Gbit Ethernet
4. Core network: Egress and ingress traffics at the edges, interoffice facility (IOF)
5. Core-network physical layer: WDM and DWDM considerations and higher-layer aspects
6. Packetized transmissions: QoS/bandwidth implications and VPN concepts in WAN transports
7. Basics of engineering, technology and economics of the Internet: Streaming of triple services (Telephone, data and video traffic) with prescribed QoS
8. Internet traffic *via* ATM and MPLS switching across the core network
9. Internet –wireless connectivity: Microwave and satellite transmissions
10. Internet status - Telecom Act of 1996 –Deregulation impacts and security/P2P issues
11. Internet economics: Tariff, rate *versus* QoS, pricing the generic (data-specific) Internet, VoIP and multimedia services
12. Internet as a global area networking: Applications *versus* engineering –an appraisal