

SYLLABUS :-

Objective: The proposed subject would address the various possible architectures and design issues of the last mile in any telecommunication network, wherein a user gets an access to the network services, viz., voice, data and video. With the evolving trends in today's telecommunication needs of the society, any operational network can be hierarchically divided into two broad segments: Access Segment providing the network services at the user end and, Core Segment providing the long-distance connectivity between different access segments. Before the deregulation of telecommunication networks, the access networks were in general designed for one given specific service, viz., voice, video or data. Thus, public-switched telephone networks (PSTN) provided plain old telephone service (POTS) to users through twisted-wire-pair cables, cable TV provided the video distribution service to its subscribers through coaxial cables, wireless communication systems provided basic telephone services along with some short messaging options and so on. Thus, a given telecom access platform was designed for one specific service, and this paradigm changed significantly in the post-deregulation era, and eventually PSTN came forward with data services through broadband access technology, cable TV started offering data and telephone services through cable modems and cable telephony, earlier version of cellular phones migrated to higher generations to offer Internet as well as multimedia services and so on. Although the existing curricula of the various related departments of the Institute offer network-related subjects, the architectures and design issues of various possible broadband access solutions using different candidate transmission media (copper, wireless and optical fiber) are yet to be addressed with the due emphasis and rigor. The proposed subject is expected to address this niche area, thereby strengthening the background of the students of the related departments and enabling them to develop a better perspective of today's complex scenario of telecommunication networking strategies.

Contents: Part I: Introduction: Brief overview of access networks with a historical perspective; Impact of deregulation on telecom networks and arrival of broadband services; Evolving trends in today's broadband access networks. Part II: Broadband access through subscriber loop in PSTN: Brief introduction to traditional PSTN; Evolution of Integrated digital networks (IDN) over PSTN setting; ISDN; Basic dial-up networks; xDSL networks. Part III: Broadband access through wireless: Overview of wireless communication systems, Signal propagation phenomena in terrestrial wireless communication links, WLAN: Network architecture, modulation schemes, multiple-access techniques, Internet connectivity; WMAN: Network Recommended Text Books/Reference Books: J. Bellamy, Digital Telephony, Wiley, 2nd Ed. B. A. Forouzan, Data Communications and Networking, Tata McGraw-Hill, 5th Ed. W. Stallings, Data and Computer Communications, Prentice Hall, 4th Ed. R. Ramaswami and K. Sivarajan, Optical Networks: A Practical Perspective, Morgan Kaufman, 2nd Ed. J. Heiskala and J. Terry, OFDM Wireless

LANs: A Theoretical and Practical Guide, Sams Publishing, 2001.â€¢A. Bachmutsky, M. Katz, and F. Fitzek, WiMAX Evolution: Emerging Technologies and Applications, Wiley, 2009.â€¢S. Parkvall, J. Skold, P. Beming, 3G Evolution, Second Edition: HSPA and LTE for Mobile Broadband, Academic Press, 2008.architecture, frequency re-use, system capacity, handover schemes, OFDMA, Benefits of MIMO and CSI-based schemes, call connectivity. Part IV: Broadband access through cable TV and optical fibers: Data and telephone services over cable TV networks; Limitations of copper and wireless access solutions; Potential capabilities of optical fibers; Hybrid fiber-coax networks; Passive optical Networks (PONs); Wavelength-division multiplexing (WDM) based PONs; Radio-over-fiber networks.