Next Generation Networks(404185)

Teaching Scheme: **Examination Scheme:**

Lectures: 4 Hrs/ Week   In Semester Assessment:

Course Objectives:

- To study the evolving wireless technologies and standards
- To understand the architectures of various access technologies such as 3G, 4G, WiFi etc.
- To understand various protocols and services provided by next generation netwoks.

Course Outcomes:

After successfully completing the course student will be able to

Keep himself updated on latest wireless technologies and trends in the communication field

Understand the transmission of voice and data through various networks.

7L

Introduction, Technology and service trends of Emerging Wireless technologies, The Amazing Growth of Mobile Communications, A Little History, Mobile Communications Fundamentals, Mobile Data, WiFi, Bluetooth, Cable Systems, Wireless Migration Options, Harmonization Process.

Unit II: Third Generation Mobile Services   6L

Introduction, Universal Mobile Telecommunications Service (UMTS), UMTS Services, The

UMTS Air Interface, Overview of the 3GPP Release 1999 Network Architecture, Overview of the 3GPP Release 4 Network Architecture, Overview of the 3GPP Release 5, All-IP Network Architecture, Overview CDMA2000, TD-CDMA, TD-SCDMA, Commonality among WCDMA, CDMA2000, TD-CDMA, and TD-SCDMA

Unit III : LTE

LTE Ecosystem, Standards, Radio Spectrum, LTE Architecture, User Equipment (UE), Enhanced Node B (eNodeB), Core Network (EPC), Radio Channel Components, TD-LTE, Multiple Input Multiple Output, LTE Scheduler, Carrier Aggregation, Cell Search, Cell Reselection, Attach and Default Bearer Activation, Handover (X2, S1, Inter-MME), Self-Organizing Networks (SONs), Relay Cells, Heterogeneous Network (HetNET), Remote Radio Heads (RRH), VoLTE, LTE Advanced

Unit IV : WiMAX

Introduction, Standards, Generic WiMAX Architecture, Core Network, Radio Network, WiMAX Spectrum, Modulation, Channel Structure, Mixed Mode, Interference Mitigation Techniques, Frequency Planning, Features and Applications, Security, QoS, Profiles, Origination, Handover, Femto and SON

Unit V : VOIP   7L

Why VoIP?, The Basics of IP Transport, VoIP Challenges, H.323, The Session Initiation Protocol (SIP), Distributed Architecture and Media Gateway Control, VoIP and SS7, VoIP Quality of Service.

Unit VI: WiFi and Next Generation WLAN   7L

WiFi (802.11), 802.11 Standards, WiFi Protocols, Frequency Allocation, Modulation and Coding Schemes, Network Architecture, Typical WiFi Configurations, Security, 802.11 Services, Hot Spots, Virtual Private Networks (VPNs), Mobile VPN, VPN Types, WiFi Integration with 3G/4G, Benefits of Convergence of WiFi and Wireless Mobile.

Text Books

1. Clint Smith, P.E., Daniel Collins, "Wireless Networks: Design and Integration for LTE, EVDO, HSPA, and WiMAX", McGrawHill Education, Third Edition
2. Eldad Perahia, Robert Stacey, "Next Generation Wireless LANs", Cambridge University Press, Second Edition.

Reference Books

1. Yi-Bang Lin, Imrich Chlamtac, "Wireless and Mobile Network Architecture", Wiley India Edition.

   Dipankar Raychaudhary, Maria Gerla, "Emerging Wireless Technologies and the Future Mobile Internet", Cambridge University Press..