

CONVERGENCE OF TECHNOLOGIES AND NETWORKING IN COMMUNICATION				
CLASS T.E. (INFORMATION TECHNOLOGY)				SEMESTER V
HOURS PER WEEK	LECTURES	:	04	
	TUTORIALS	:	--	
	PRACTICALS	:	02	
			HOURS	MARKS
EVALUATION SYSTEM:	THEORY		3	100
	PRACTICAL		--	--
	ORAL		--	25
	TERM WORK		--	25

1. Introduction:

Communication model, Data Communication, Data representation transmission, modes of data transmission, synchronous and asynchronous communication, Network and services. Introduction to 2G, 3G and 4G Wireless communication system.

2. Convergence Technology

The blending or integration of voice, video, data and image into one flexible network, overview of network topology.

3. Modem

Digital modulation methods, ASK, PSK, FSK. Modem and standards, Data multiplexers, Multiplexing techniques, Comparison of data multiplexing techniques ADSL, RADSL, HDSL, SDSL.

4. Bandpass Modulation

Binary phase shift keying, Probability of error for Binary phase shift keying Differentially encoded phase shift keying, Probability of error for DEPSK, QPSK, M-ary PSK, Quadrature amplitude shift keying, Binary frequency Shift keying, M-ary FSK Minimum shift keying (MSK). Error performance for binary systems, Probability of error for coherently detected Binary orthogonal FSK, GMSK.

5. Network Services and Protocol Layering

Connection oriented & connectionless services, their comparison layered architecture, services Interface, primitives and service access points, Ad-hoc wireless networks, Handoff Algorithms, Bluetooth Technology and Infrared Technology.

6. Transmission and Multiple Accesses

Transfer Modes circuit switching, routing, virtual circuit switching comparison of transfer modes Asynchronous transfer mode. Multiple access concepts FDMA/TDMA in GSM networks, CDMA in UMTS Networks.

7. Data Transmission Functions

Probability of error for coherently detected BPSK, Data link control, Data link line configurations, data link layer functions, services offered to network Layer DLC protocol layering logical link control (LLC) Media access control (MAC), Flow

control protocols Error detection and correction mechanisms e.g. HDLC Bridging Transparent source route bridging in ETHERNET LANS, switching components of typical switch performance measures in switch design switching, switching issues, switching architectures shared-memory architecture, shared-medium architectures space division architecture switching in ATM and its examples.

8. Communication Network Functions

Addressing techniques, classification of addressing techniques, addressing structure in INTERNET addressing structure in Telecom Networks, signaling complexity in Different Networks, Classification of signaling techniques signaling issues, Signaling models, point to multipoint signaling, ISDN signaling, Routing protocols/techniques, core routing concepts, core routing concepts.

9. Traffic Management

Concept of traffic, concept of service, Network capabilities, Types of traffic, Traffic Management, Traffic contract management, traffic policing, priority control, priority control Flow control versus congestion control, Traffic Management in ATM.

10. Network Management

Goals of Network Management, Functional Areas of Network Management Telecommunications management Network (TMN).

11. Security Management

Security Management, symmetric (secret key) Encryption Techniques, Asymmetric encryption techniques, Key management, Hash functions, Digital signatures and certificates, Firewalls, Security management in Third generation UMTS network.

12. Convergence Technologies for 3G Networks

Operation and integration of GSM, GPRS, EDGE, UMTS, CDMA2000, IP, and ATM, practical examples of 3G connection scenarios. Signaling flows and protocol stacks, IP and ATM as used in a 3G context, issues of QoS and real-time application support IP/SS7 internetworking and IP soft switching, the architecture of the IP Multimedia Subsystem (IMS) for UMTS

Text Books:

1. Sumit Kasera, Nishit Narang, Sumita Narang, "Communication Networks Principles and Practice" Tata McGraw-Hill Publishing company Limited New Delhi
2. Jeffrey Bannister, Paul Mather, Sebastian Coope "Convergence Technologies for 3G Networks: IP, UMTS, EGPRS and ATM", Wiley india
3. Skalar, "Digital communications", Pearson education, 2001 2nd Edition.
4. William Stallings, "Data and Computer Communication", Pearson Education, 6th Edition.
5. Lean Garcia, Widjaja, "Communication Networks", Tata McGraw Hill, 2nd Edition.
6. T. S. Rappaport, "Wireless Communication", Pearson Education, 2nd Edition.

Reference Books:

1. Forouzan, Data Communication & Networking, Tata Mcgraw Hill, 3rd Edition.
2. Andrew Tanenbaum, Computer Networks, Prentice Hall of India.

3. Raj Pandya, Mobile & Personal Communication system & services, Prentice Hall of India.

Term Work:

Term work shall consist of at least 10 practical experiments covering all topics and one written test.

Marks

Distribution of marks for term work shall be as follows:

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| 1. Attendance (Theory and Practical) | 05 Marks |
| 2. Laboratory work (Experiments and Journal) | 10 Marks |
| 3. Test (at least one) | 10 Marks |

The final certification and acceptance of Term Work ensures the satisfactory Performance of laboratory Work and Minimum Passing in the term work.

Suggested Experiment List

1. To study PC to PC Communication.
2. To study ASK, PSK, FSK techniques.
3. To study Hand off algorithm for Ad-hoc wireless networks.
4. To study Belmann Ford Algorithm.
5. To study Dijkstra's Algorithm.
6. To study OFDM (Orthogonal Frequency Davison Multiplexing) technique.
7. To study Static channel allocation scheme.
8. To study Dynamic channel allocation scheme.
9. To study various types of signaling techniques.
10. To study various types of Encryption techniques.
11. Simulation of routing protocols using Network Simulators like NS2, Nistnet etc.
12. Study of M/M/1 Queuing Model