



**Technical Examination Board, Gujarat State,
Gandhinagar**

Data Communication and Computer Networking

Title	IOT101: Data Communication and Computer Networking
Level	Certificate Course
Course Duration	Twelve Weeks (Part time) Four Weeks (Full Time) 120 Hrs (Th. 48 Hrs + Pr. 72 Hrs)
Entry Qualification	B.E./B.Tech/Diploma/B.E. Sem.III onward/ Diploma Sem. IV onward (EC/IC/ELE/MECH/IT/CE or Similar Branch)/ BCA/MCA/B.Sc./M.Sc./Any other graduate(with Physics/IT)

Teaching Scheme:

Sub Code	Subject Name	Teaching Scheme		Examination Scheme				Term Work Marks	Total Marks
		Theory	Practical	Theory Marks	Hrs	Practical Marks	Hrs		
IOT101	Data Communication & Computer Networking	4	6	50	2	100	4	25	175

Total Week	= 12	Theory	= 1 hour slot
Total Teaching slot/Week	= 07	Practical	= 2 hour slot
Theory Periods	= 48	Total teaching	
			10 hours/week (Part-time)
			06 hours/day (Full time)
Practical Periods	= 36		

IOT 101: Data Communication and Computer Networking

Data Communication and Computer Networking management is the process that helps you know the working state of your network. It also enables you to fix various discovered or undiscovered network problems.

In today's networks, it's a complicated exercise to monitor and maintain how well your network is functioning. Network management involves so many different components that you need the right people, technologies, and tools to do it well.

Course Objectives:

After completion of this course students will be able

- . To describe network hardware and computer network components.
- . To execute network administrator duties and utilities.
- . To implement server organisation, user rights, user addition, maintenance of security and user accounting.
- . To develop interpersonal skills and professional skills as a network manager.

IOT101 : DATA COMMUNICATION & NETWORKING

Unit-1	Network Fundamentals
1.1	Need and Advantages of Computer Networks
1.2	Applications of computer networks: Business, Industrial and home applications
1.3	Components of Computer Networks: hardware and software
1.4	Network topologies: Star, Ring, Bus, Mesh, Tree, Hybrid
1.5	Network Classification a) Based on Transmission Technologies: Point-to point, broadcast b) Based on scale: PAN, LAN, WAN, MAN,VPN, Internet c) Based on Architecture: Peer to Peer, Client Server, advantages of Client Sever over Peer-to-Peer Model
Unit -2	Reference Model
2.1	Terms :Protocol, Interface, Services, Primitives, semantics, syntax
2.2	The OSI-ISO Reference Model:, Brief functional description of each layers with list of protocols
2.3	The TCP/IP Reference Model: Brief functional description of each of the Layer with list of protocols, Sub layers of Data Link Layers: MAC, LLC
Unit -3	Network Media and Hardware
3.1	Transmission Media: Unguided and Guided media, Wired and Wireless a) UTP, b) Coaxial c) Fiber cable
3.2	Physical Layer Interfaces: Types of Connectors and Signals
3.3	Line coding and Line coded signal, Remote connecting device: DTE and DCE
3.4	Network devices: Repeater, Hub, Bridge, Switch , Router, B-router, Gateway, Network Adapter, Access point, Wireless Access point
3.5	Fast Vs Gigabit Ethernet and FDDI Vs CDDI
3.6	Servers: File, Print, Mail, Proxy, Web
3.7	Cable modem system, ADSL and broad band modem
3.8	Digital Subscriber Line technology: DSL, ADSL, HDSL

Unit -4	Internet Architecture
4.1	Internet addresses: gateway addressing, network and broadcast addressing, dotted decimal notation, loopback addressing
4.2	IP layer Protocols: IPv4 and IPv6 frame Format
4.3	Connection oriented and Connectionless services
4.4	TCP and UDP frame format
4.5	Domain Name System: Introduction, mapping to IP addresses
4.6	Security –Social issues, Hacking, precautions and Firewall, Cyber security Laws
Unit -5	Internet Services and its applications
5.1	Internet Services World Wide Web: Web browser, HTML, web servers
5.2	Electronic Mail: Functions of E-mail system, User agent, Message format , Mail Protocols (SMTP, POP3),FTP, Remote Login
5.3	Voice and Video over IP
5.4	Social services: Forum, Newsgroup, blog

Suggested List of Practicals

Sr. No	Practical Name
1	Prepare detailed report of existing LAN in the Department/Institute
2	Connect computer terminal in various physical topologies and test the data transfer.
3	Compare performance of various types physical layer Connectors
4	Compare performance of various types of Transmission media and Connectors
5	Prepare and Test Straight UTP Cable
6	Prepare and Test Cross UTP Cable
7	Prepare and Test Cross CAT5,CAT6 and RJ11Cable
8	Install/configure/Test Network Interface Card/port
9	Install/configure/Test Networking devices
10	Install/configure/Test small LAN using Hub/switch
11	Install/configure/Test File Server

12	Install/configure/Test Print Server
13	Install/configure/Test Web Server
14	Install/configure/Test a small wireless network using access points
15	Install/configure/Test Peer to Peer LAN and sharing of resources
16	Install/configure/Test Network operating System
17	Configure/Test Internet connectivity
18	Install and configure a Firewall for the network security
19	Check performance of network using ping, trace route commands
20	Prepare report on e-mail service: contact list, group list, sorting, searching, spam, inbox, sent mail, draft
21	Compare the performance of various web browser: home page, cookies, bookmark, history, favourites, download folder etc
22	Use simple Network Commands for the network control operations

Reference books:

- Data Communication and Networking, Behrouz A. Forouzan, McGraw-Hill
- Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI
- An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education
- Data and Computer Communication, Stallings Williams, PHI Learning, New Delhi (Latest edition).
- Network Management- Principles and Practices, Mani Subramanian, Pearson Education
- Network Manager's Handbook, Nathan Muller, MacGrow Hill NETWORKING.
- Professionalism—Skills for Workplace Success, Lydia E. Anderson and Sandra B. Bolt, 4e, Pearson Education/PHI

Software list:

- Windows OS : 10x or higher
- Linux/Ubuntu/Unix OS
- Network Simulation Tool
- Packet Tracer
- LAN Protocol Simulation & Analyzer Software

Subject Course Committee

Prof. C. H. Vithalani, Prof. P. J. Brahmbhatt, Prof. T. P. Chanpura, Prof. M. S. Dave, Prof. P. B. Bhatt, Prof. J. A. Dhumale, Prof. A. S. Patel, Prof. A. K. Konkani