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| **Course Name:** | | | | | | | | | | Bachelor of Computer Applications | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | |  | | |
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| **Subject Name:** | | | | | | | | | | Data Communication and Computer Networks | | | | | | | | | | | | | | | | | | | | | | | | | **Subject Code:** | | | | | | | | TBC-301 | | |
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| **1** | **Contact Hours:** | | | | | | | | | | | 45 | | | | |  | | | | | | | | | | | | | | | | | | | **L** | | 3 | | | **T** | | 0 | **P** | 0 | |
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| **2** | **Examination Duration(Hrs):** | | | | | | | | | | | | | | | | | | | | | |  | **Theory** | | | | | 0 | 3 |  | **Practical** | | | | | 0 | | 0 | |  | | | | |
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| **3** | **Relative Weightage:** | | | | | | | | | | | | | |  | | | | | **CWE:** | | | | | | | 25 | | **MTE:** | | | 25 | | **ETE:** | | | | 50 | | | |  | | | |
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| **4** | **Credits:** | | | | | | | 0 | | | 3 |  | | | | | | | | | | | | | |  | | |  | | |  | |  | | | |  | | | |  | | | |
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| **5** | **Semester:** | | | | | | | | **🗸** | | |  | | | |  | | |  | | |  | | |  | | | | | | | | | | | | | | | | | | | | |
|  |  | | | | | | **Autumn** | | | | | | **Spring** | | | | | | | | **Both** | | | | | | |  | | | | | | | | | | | | | | | | | |
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| **6** | **Pre-Requisite:** | | | | | | | | | | | | | Basic idea of the network | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **7** | **Subject Area:** | | | | | | | | | | | | | Networking | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **8** | **Objective:** | | | | | | | | | | | | | To familiarize students with the networking concepts and protocols. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **9** | **Course Outcome:** | | | | | | | | | | | | | A student who successfully fulfills the course requirements will be able to- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | **CO1** | | | | | Describe the basis and structure of an abstract layered protocol model | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | **CO2** | | | | | Describe, analyse and compare a number of datalink, network, and transport layer protocols. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | **CO3** | | | | | Design and implement datalink or network layer protocols within a simulated networking environment. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | **CO4** | | | | | Describe and analyse various related technical, administrative and social aspects of specific computer network protocols from standards documents and other primary materials found through research. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | **CO5** | | | | | Identify and apply basic theorems and formulae for the information-theoretic basis of communication and the performance of physical, datalink and network protocols  . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **10** | | **Details of the Course:** | | | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Unit No.** | | | | **CONTENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | |
| **1** | | | | **BasicsofComputerNetworks:**Computer Network, Definition, Goals, Applications, Components, Topology and its types, Types of Networks, (LAN, MAN, WAN, Internet), Broadcast & Point-To-Point Networks, Modes of transmission (Serial, Parallel, Synchronous, Asynchronous and Isochronous). **Modes of Communication:** Simplex, Half Duplex, Full Duplex, Protocols and Standards.  **Network Models:** Design issues of the layer, Protocol Hierarchy, **ISO-OSI Reference Model:** Internet Model, TCP/IP Protocol Suite, Ports, and Comparison of ISO-OSI and Internet Model. Multiplexing (FDM, WDM and TDM), and switching (Circuit switching, Packet Switching and Comparison of both) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | |
| **2** | | | | **Encoding and modulation:** Physical layer Introduction, Functions and services of physical layer, Signals and their characteristics, Analog & Digital Signals, Bandwidth, Bitrate, Baudrate, Binary to Digital Encoding (Unipolar, Polar, Bipolar), Analog to Digital (PCM), Digital to Analog Conversion (ASK, FSK, PSK, QAM), Analog to Analog Modulation (AM, FM, PM).  **Transmission Media:** Types of Transmission Media, Guided Media (Wired): Coaxial Cable, Twisted Pair: UTPVs STP, Connectors. Fiber Optics Cable, Advantages & disadvantages, Unguided Media (Wireless), Wireless Transmission, Radio Waves, Infra-Red, Micro-Wave. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | |
| **3** | | | | **Data Link Layer:** Data link Layer Introduction & Design issues, Functions of DLL & Services provide to network layer, Framing, Error control.  LAN protocols: Ethernet Basic Features, Types, IEEE802.3, IEEE802.4, IEEE802.5 Frame format, **Medium Access Methods**: Random access protocols, Collision free protocols, Token passing protocols, **Flow Control**: Stop-n-wait protocol, Sliding window protocol. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | |
| **4** | | | | **Network Layer:** Network layer services and functions, IPv4 frame format, IP addressing, Introduction to Routing, Concept of Intranet & Extranet.  **Internet working Devices:** Categories of Connectivity Devices, Hubs, Repeaters, Bridges, Switches, Gateways. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | |
| **5** | | | | **Transport Layer:** TCP protocol and its frame format, User Datagram Protocol, Services of TCP and UDP protocol.  **Application Layer**: Domain Name System, Simple Network Management Protocol, Electronic mail (SMTP, POP3 and IMAP4), File Transfer Protocol, Hyper Text Transfer Protocol, Telnet. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | |
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| **11** | | **Suggested Books:** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | |
| **Sl. NO.** | | | **NAME OF AUTHERS/BOOKS/PUBLISHERS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **YEAR OF PUBLICATION** | | | | |
| **1** | | | Forouzan, “Data Communication and Networking”, TMH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2007 | | | | |
| **2** | | | A.S Tanenbaum, “Computer Networks, 3rd Edition”, PHI | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2005 | | | | |
| **3** | | | W.Stallings, “Data and Computer Communication”, Macmillan Press | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2005 | | | | |
| **4** | | | Comer, “Computer Networks & Internet”, PHI | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2003 | | | | |
| **5** | | | Forouzan, “TCP/IP Networking”, TMH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2007 | | | | |
| **6** | | | Peter Norton, “Complete Guide to Networking”., Techmedia | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2006 | | | | |