|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NAME OF DEPARTMENT:** | | | | | | | | | | | | | | | | | | School of Computing | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Subject Name:** | | | | | | | | Data Communication and Computer Networks | | | | | | | | | | | | | | | | | | | | | | | | | | **Subject Code:** | | | | | | | | TBC 402 | | | |
|  | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | |  | | | |
| **Course Name:** | | | | | | | | Bachelor of Computer Applications (BCA) | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | |  | | | |
|  | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | | | |  | | | | |
| **1** | **Contact Hours:** | | | | | | | | | | 48 | | | |  | | | | | | | | | | | | | | | | | | | | **L** | | 3 | | | **T** | | 1 | **P** | 0 | | |
|  |  | | | | | | | | | |  | | | |  | | | | | | | | | | | | | | | | | | | |  | |  | | |  | |  |  |  | | |
| **2** | **Examination Duration (Hrs):** | | | | | | | | | | | | | | | | | | | | |  | **Theory** | | | | | 0 | 4 |  | **Practical** | | | | | 0 | |  | |  | | | | | |
|  |  | | | | | | | | | | | | | | | | | | | | |  |  | | | | |  |  |  |  | | | | |  | |  | |  | | | | | |
| **3** | **Relative Weightage:** | | | | | | | | | | | |  | | | | | | **CWE:** | | | | | | | 25 | | **MTE:** | | | 25 | | **ETE:** | | | | 50 | | | |  | | | | |
|  |  | | | | | | | | | | | |  | | | | | |  | | | | | |  | | |  | | |  | |  | | | |  | | | |  | | | | |
| **4** | **Credits:** | | | | | 0 | | | 4 | |  | | | | | | | | | | | | | |  | | |  | | |  | |  | | | |  | | | |  | | | | |
|  |  | | | | |  | | |  | |  | | | | | | | | | | | | | |  | | |  | | |  | |  | | | |  | | | |  | | | | |
| **5** | **Semester:** | | | | | |  | | | |  | | | **\*** | | | |  | | |  | | |  | | | | | | | | | | | | | | | | | | | | | |
|  |  | | | | **Autumn** | | | | | | | **Spring** | | | | | | | | **Both** | | | | | | |  | | | | | | | | | | | | | | | | | | |
|  |  | | | |  | | | | | | |  | | | | | | | |  | | | | | | |  | | | | | | | | | | | | | | | | | | |
| **6** | **Pre-Requisite:** | | | | | | | | | | **Knowledge of computers** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **7** | **Subject Area:** | | | | | | | | | | **Computer Applications** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **8** | **Objective:** | | | | | | | | | **To familiarize students with the Concept of Computer Networks** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **9** | **Course Outcomes:** | | | | | | | | | | | | | A student who successfully fulfills the course requirements will be able to: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | | 1. Describe the basis and structure of an abstract layered protocol model 2. Describe, analyse and compare a number of datalink, network, and transport layer protocols 3. Design and implement datalink or network layer protocols within a simulated networking environment 4. Ddescribe and analyse various related technical, administrative and social aspects of specific computer network protocols from standards documents and other primary materials found through research 5. Identify and apply basic theorems and formulae for the information-theoretic basis of communication and the performance of physical, datalink and network protocols | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **10** | | **Details of the Course:** | | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Unit No.** | | | | **CONTENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **CONTACT HOURS** | | | | | | |
| **1** | | | | Introduction to Computer Network: Types of Network: Based on Topology (Bus, Star, Ring Mesh, Tree); Based on Size Technology and ownership (LAN, MAN, WAN); Based on Computing (Centralized, Distributed and Collaborative), Based on Connection management (Connection-Oriented and Connectionless) Data Transmission: Analog and Digital - Data, Signals, Transmission Systems, Asynchronous and Synchronous transmission. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 8 | | | | | | |
| **2** | | | | Analog and Digital Transmission; Bandwidth, Channel Capacity – Nyquist Bandwidth, Shannon Capacity Formula, Baud v/s Bit Rate, Transmission Impairments, Modulation: Analog (Analog to Analog, Digital to Analog) and Digital (Analog to Digital, Digital to Digital). Data Transmission & Transmission Media: Multiplexing - FDM, TDM, WDM, Concepts of Frequency Spread Spectrum, Transmission Media (Guided, Unguided), | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 | | | | | | |
| **3** | | | | Design Issues for the Layers, Interfaces and Services, ISO-OSI Reference Model and TCP/IP Model. Physical Layer: Design Issues, Services provided to Upper Layer, Physical Layer Specification. Switching- Message, Circuit, Packet, Frame relay, Asynchronous Transfer Mode (ATM). | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 | | | | | | |
| **4** | | | | Data Link: Services provided to the Upper Layer, Framing, Error Control, Flow Control; Acknowledgement; IEEE Standards for MAC Sub layer. Network Layer: Services provided to the Upper Layer, IP addressing, Routing Algorithms, IPv4 protocol. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 | | | | | | |
| **5** | | | | Upper Layers: Transport Layer: Services provided to the Upper Layers, Elements of Transport Control Protocols -Physical Connection Management; Introduction to TCP and UDP.  Application layer Protocol- DNS, TelNet, HTTP, SNMP, SMTP, IMAP4, POP3, WWW, FTP, URL. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 | | | | | | |
|  | | | | **TOTAL** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **48** | | | | | | |
|  | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | |
|  | | | |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | |
| **11** | | **Suggested Books:** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | | | | | |
| **Sl. NO.** | | | **NAME OF AUTHORS/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 | | | | | |