

| <b>DATA COMMUNICATION</b><br><b>(Effective from the academic year 2018 -2019)</b><br><b>SEMESTER – IV</b>   |               |                   |                      |
|---|---------------|-------------------|----------------------|
| <b>Course Code</b>  | <b>18CS46</b> | <b>CIE Marks</b>  | 40                   |
| <b>Number of Contact Hours/Week</b>   | 3:0:0         | <b>SEE Marks</b>  | 60                   |
| <b>Total Number of Contact Hours</b>  | 40            | <b>Exam Hours</b> | 03                   |
| <b>CREDITS –3</b>   |               |                   |                      |
| <b>Course Learning Objectives:</b> This course (18CS46) will enable students to: <ul style="list-style-type: none"> <li>• Comprehend the transmission technique of digital data between two or more computers and a computer network that allows computers to exchange data.</li> <li>• Explain with the basics of data communication and various types of computer networks;</li> <li>• Demonstrate Medium Access Control protocols for reliable and noisy channels.</li> <li>• Expose wireless and wired LANs.</li> </ul> |               |                   |                      |
| <b>Module 1</b>   |               |                   | <b>Contact Hours</b> |
| <b>Introduction:</b> Data Communications, Networks, Network Types, Internet History, Standards and Administration, <b>Networks Models:</b> Protocol Layering, TCP/IP Protocol suite, The OSI model, <b>Introduction to Physical Layer-1:</b> Data and Signals, Digital Signals, Transmission Impairment, Data Rate limits, Performance.<br><b>Textbook1:</b> Ch 1.1 to 1.5, 2.1 to 2.3, 3.1, 3.3 to 3.6<br><b>RBT: L1, L2</b>   |               |                   | 08                   |
| <b>Module 2</b>   |               |                   |                      |
| <b>Digital Transmission:</b> Digital to digital conversion (Only Line coding: Polar, Bipolar and Manchester coding).<br><b>Physical Layer-2:</b> Analog to digital conversion (only PCM), Transmission Modes,<br><b>Analog Transmission:</b> Digital to analog conversion.<br><b>Textbook1:</b> Ch 4.1 to 4.3, 5.1<br><b>RBT: L1, L2</b>  |               |                   | 08                   |
| <b>Module 3</b>   |               |                   |                      |
| <b>Bandwidth Utilization:</b> Multiplexing and Spread Spectrum,<br><b>Switching:</b> Introduction, Circuit Switched Networks and Packet switching.<br><b>Error Detection and Correction:</b> Introduction, Block coding, Cyclic codes, Checksum,<br><b>Textbook1:</b> Ch 6.1, 6.2, 8.1 to 8.3, 10.1 to 10.4<br><b>RBT: L1, L2</b>   |               |                   | 08                   |
| <b>Module 4</b>   |               |                   |                      |
| <b>Data link control:</b> DLC services, Data link layer protocols, Point to Point protocol (Framing, Transition phases only).<br><b>Media Access control:</b> Random Access, Controlled Access and Channelization,<br><b>Introduction to Data-Link Layer:</b> Introduction, Link-Layer Addressing, ARP<br><b>IPv4 Addressing and subnetting:</b> Classful and CIDR addressing, DHCP, NAT<br><b>Textbook1:</b> Ch 9.1, 9.2, 11.1, 11.2 11.4, 12.1 to 12.3, 18.4<br><b>RBT: L1, L2</b>  |               |                   | 08                   |
| <b>Module 5</b>   |               |                   |                      |
| <b>Wired LANs Ethernet:</b> Ethernet Protocol, Standard Ethernet, Fast Ethernet, Gigabit Ethernet and 10 Gigabit Ethernet,<br><b>Wireless LANs:</b> Introduction, IEEE 802.11 Project and Bluetooth.<br><b>Other wireless Networks:</b> Cellular Telephony  |               |                   | 08                   |

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| <b>Textbook1: Ch 13.1 to 13.5, 15.1 to 15.3, 16.2</b><br><br><b>RBT: L1, L2</b>   |  |
| <b>Course Outcomes:</b> The student will be able to :   |  |
| <ul style="list-style-type: none"> <li>• Explain the various components of data communication.</li> <li>• Explain the fundamentals of digital communication and switching.</li> <li>• Compare and contrast data link layer protocols.</li> <li>• Summarize IEEE 802.xx standards</li> </ul>   |  |
| <b>Question Paper Pattern:</b>  |  |
| <ul style="list-style-type: none"> <li>• The question paper will have ten questions.</li> <li>• Each full Question consisting of 20 marks</li> <li>• There will be 2 full questions (with a maximum of four sub questions) from each module.</li> <li>• Each full question will have sub questions covering all the topics under a module.</li> <li>• The students will have to answer 5 full questions, selecting one full question from each module.</li> </ul>   |  |
| <b>Textbooks:</b>   |  |
| <ol style="list-style-type: none"> <li>1. Behrouz A. Forouzan, Data Communications and Networking 5E, 5<sup>th</sup> Edition, Tata McGraw-Hill, 2013.</li> </ol>  |  |
| <b>Reference Books:</b>   |  |
| <ol style="list-style-type: none"> <li>1. Alberto Leon-Garcia and Indra Widjaja: Communication Networks - Fundamental Concepts and Key architectures, 2nd Edition Tata McGraw-Hill, 2004.</li> <li>2. William Stallings: Data and Computer Communication, 8th Edition, Pearson Education, 2007.</li> <li>3. Larry L. Peterson and Bruce S. Davie: Computer Networks – A Systems Approach, 4th Edition, Elsevier, 2007.</li> <li>4. Nader F. Mir: Computer and Communication Networks, Pearson Education, 2007.</li> </ol> |  |