# 19CS2204 - COMPUTER NETWORKS

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| **Course Category:** |  Program Core | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture - Tutorial - Practical:** | 3-0-0 |
| **Prerequisite:** | Knowledge in computer fundamentals and basic network essentials. | **Sessional Evaluation:****Univ. Exam Evaluation:****Total Marks:** | 4060100 |
| **Objectives** | * To learn the essentials of computer network layers and Transmission media.
* Explore the general issues regarding MAC, Network and Transport layers.
* Study various protocols in TCP/IP suite.
* Understand the working principle of DNS and E-mail.
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| **Course Outcomes** | Upon successful completion of the course, the students will be able to: |
| CO1 | Understand the basics of computer network layers and overview on transmission. |
| CO2 | Get the design issues, and protocols of data link layer. |
| CO3 | Study various multiple access protocols, and internetworking devices. |
| CO4 | Explore the basic design issues, study various routing, and congestion control algorithms. |
| CO5 | Learn the concept of IPv4 issues and overview on transport layer issues. |
| CO6 | Understand the basic TCP issues and exposure on DNS & E-Mail. |
| **Course Content** | UNIT-I**Introduction:** Use of Computer Networks, Network Hardware, Network Software. **Reference Models:** TCP/IP Model, The OSI Model, Comparisons of the OSI and TCP/IP reference model. **Physical Layer:** Guided Transmission Media.UNIT-II**Data Link Layer:** Design issues, Error Detection and Correction, Elementary Data Link Layer Protocols, Sliding window protocol, Examples Data link Protocols.UNIT-III**Multi Access Protocols:** the Channel allocation Problem.**Multiple Access Protocols:** ALOHA, CSMA, Collision free protocols.**Data link layer switching:** Bridges from 802.x to 802.y, local internetworking, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.UNIT-IV**Network Layer:** Design issues: store and forward packet switching, Services Provided to the Transport Layer, Implementation of connection less and connection oriented.**Routing algorithms:** optimality principle, shortest path, flooding, Distance Vector Routing, the Count-to-Infinity Problem, Link State Routing, Hierarchical Routing, Congestion Control Algorithms.UNIT-V**Internetworking:** Connectionless Internetworking, Tunneling, Internetwork Routing, fragmentation, IPv4, IP addresses. **Transport Layer:** The transport Service - Services provided to the upper layers, Transport Service Primitives, Connection Release, Flow Control and Buffering, Multiplexing, Crash Recovery. **The Internet Transport Protocols UDP:** Introduction to UDP, RPC.UNIT-VI**The Internet Transport Protocols TCP**: Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modeling. **Application Layer:** Introduction, DNS, Electronic mail. |
| **Text Books and References:** | Text Books:1. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.
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| Reference Books:1. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013
2. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Edication.
3. Computer Networks, L. L. Peterson and B. S. Davie, 4th edition, ELSEVIER.
4. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Eduction.
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| **E-Resources** | 1. <https://nptel.ac.in/courses>
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