

UE18CS301: COMPUTER NETWORKS (4-0-0-0-4)**Course Information**

of Credits: 4

of Hours: 56

| Class # | Chapter Title /Reference Literature | Topics to be Covered | % of Portion covered | |
|---|-------------------------------------|--|----------------------|--------------|
| | | | % of Syllabus | Cumulative % |
| Unit – 1 Computer Networks and the Internet | | | | |
| 1 | 1.1.1 | Introduction to computer networks, What is internet? A Nuts-and-Bolts description | 17.86 | 17.86 |
| 2 | 1.1.2, 1.1.3 | A services description, What is a Protocol? | | |
| 3 | 1.2.1 | Network edge: Access networks | | |
| 4 | 1.2.2 | Physical media | | |
| 5 | 1.3.1 | Network core: Packet switching | | |
| 6 | 1.3.2, 1.3.3 | Circuit switching, Network of networks | | |
| 7 | 1.4.1, 1.4.2 | Overview of delay in Packet-switched networks, Queuing delay and Packet loss | | |
| 8 | 1.4.3, 1.4.4 | End-to-End delay, Throughput in computer networks | | |
| 9 | 1.5 (T1) 2.1, 2.2 (R1) | Protocol layers - The OSI model | | |
| 10 | 2.3 (R1) 1 (R2) | TCP/IP protocol suite, Introduction to Cloud computing | | |
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| Unit – 2 Application Layer | | | | |
| 11 | 2.1.1, 2.1.2, | Network application principles: Network application architectures, Processes communication | 21.43 | 39.29 |
| 12 | 2.1.3, 2.1.4 | Transport services available to applications, Transport services by Internet | | |
| 13 | 2.2.1, 2.2.2 | The web and HTTP, Non-persistent and Persistent connection | | |
| 14 | 2.2.3 | HTTP message format, HTTP vs HTTPS | | |
| 15 | 2.2.4 | Cookies | | |
| 16 | 2.2.5 | Web caching | | |
| 17 | 2.4.1, 2.4.2 | DNS – Services provided, Overview of how DNS works | | |
| 18 | 2.4.3 | DNS records and messages | | |
| 19 | 2.5.1 | Peer-to-Peer applications | | |

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|--|----------------------------|--|-------|-------|--|--|
| 20 | 2.7.1 | Socket Programming with UDP | | | | |
| 21 | 2.7.2 | Socket Programming with TCP | | | | |
| 22 | 20, 21, 23, 24 (R1) | Other Application Layer Protocols: FTP, SMTP, SNMP, Telnet, SSH | | | | |
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| Unit – 3 Transport Layer | | | | | | |
| 23 | 3.1 | Introduction to transport layer, Relationship between transport and network layer, Overview of the transport layer in the Internet | 21.43 | 60.72 | | |
| 24 | 3.2 | Multiplexing and Demultiplexing | | | | |
| 25 | 3.3 | Connectionless transport: UDP, Segment structure, Checksum | | | | |
| 26 | 3.4.1 | Principles of reliable data transfer, Building a reliable data transfer protocol | | | | |
| 27 | 3.4.2 | Pipelined reliable data transfer protocol | | | | |
| 28 | 3.4.3 | Go-Back-N protocol | | | | |
| 29 | 3.4.4 | Selective repeat | | | | |
| 30 | 3.5.1, 3.5.2, 3.5.3, 3.5.4 | Connection Oriented Transport: TCP, The TCP connection, TCP segment structure | | | | |
| 31 | 3.5.5 | Flow control | | | | |
| 32 | 3.5.6 | TCP connection management | | | | |
| 33 | 3.6 | TCP congestion control | | | | |
| 34 | 3.6 | TCP congestion control | | | | |
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| Unit – 4 Network Layer and Internet Protocol | | | | | | |
| 35 | T1: 4.1 | Overview of network layer, Forwarding and routing, Network service models | 21.43 | 82.15 | | |
| 36 | 4.2.1, 4.2.2 | Inside router: Input port processing and Destination-based forwarding, Switching | | | | |
| 37 | 4.2.3, 4.2.4, 4.2.5 | Output port processing, where does Queueing occur? Packet scheduling | | | | |
| 38 | 4.3.1, 4.3.2 | The Internet Protocol – IPv4, Datagram format, Fragmentation | | | | |
| 39 | 4.3.3 | IPv4 Addressing | | | | |
| 40 | 4.3.3 | IPv4 Addressing | | | | |
| 41 | 4.3.4 | IPv4 Addressing, NAT | | | | |
| 42 | 26.1, 26.2, 26.3 (R1) | IPv6 Addressing: Introduction, Address space allocation, Global unicast addresses | | | | |
| 43 | 26.4, 26.5 (R1) | IPv6 Addressing: Autoconfiguration, Renumbering | | | | |

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| 44 | 27.1, 27.2, 27.3 (R1) | IPv6 Addressing: Packet format, Transition from IPv4 to IPv6 | | |
| 45 | 4.3.3 | Network layer protocols: DHCP, ICMP | | |
| 46 | 5.2 | Introduction to routing algorithms: Link state and Distance vector | | |
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| Unit – 5 Link Layer and LAN | | | | |
| 47 | T1: 6.1, 6.2: 6.2.1 | Introduction to link layer, Error-detection and correction techniques: Parity checks, Internet checksum, Cyclic redundancy check | 17.85 | 100 |
| 48 | 6.2.2 | Multiple access protocols: CSMA/CD | | |
| 49 | 6.2.3 | Switched LAN: Link layer addressing and ARP | | |
| 50 | 6.4.1 | Ethernet | | |
| 51 | 6.4.2 | Link-layer switches | | |
| 52 | 6.4.3 | Retrospective: A day in the life of a web page request | | |
| 53 | 6.4.4 | Physical layer: Purpose, Signals to Packets | | |
| 54 | 6.7 | Analog vs Digital Signals, Transmission media | | |
| 55 | 7.3 (T1) 3.2 (R1) | Wireless LANs: IEEE 802.11 LAN architecture | | |
| 56 | 7.3.2, 7.3.3 | 802.11 MAC protocol, IEEE 802.11 Frame | | |

| Book Type | Code | Title & Author | Publication Information | | |
|------------------------|------|--|-------------------------|---------------------------|------|
| | | | Edition | Publisher | Year |
| Text Books | T1 | “Computer Networking - A Top - Down Approach”, James F Kurose, Keith W. | 7 | Pearson | 2017 |
| Reference Books | R1 | “TCP IP Protocol Suite”, Behrouz Forouzan | 4 | McGraw-Hill | 2010 |
| | R2 | “Mastering Cloud Computing, Foundations and Applications Programming”, Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi. | | Morgan Kaufmann, Elsevier | 2013 |