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		
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		

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		

		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		
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	**21.43**	**60.72**
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		

		Unit – 4 Network Layer and Internet Protocol		
35	T1: 4.1	Overview of network layer, Forwarding and routing, Network service models		
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	**21.43**	**82.15**
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		

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		
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