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Computer Communication Networks

(Code : ECC602)

Semester VI – Electronics and Telecommunication Engineering
(Mumbai University)

Strictly as per New Choice Based Credit and Grading System Syllabus
(Revise 2019 'C' Scheme) of Mumbai University with effective from Academic Year 2021-2022

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We dedicate this Publication soulfully and wholeheartedly,

in loving memory of our beloved founder director,

Late Shri. Pradeepji Lalchandji Lunawat,

who will always be an inspiration, a positive force and strong support behind us.

"My work is my prayer to God"

– Lt. Shri. Pradeepji L. Lunawat

Soulful Tribute and Gratitude for all Your Sacrifices, Hardwork and 40 years of Strong Vision…

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Syllabus…

Computer Communication Networks : Sem. VI (Electronics and Telecomm. Engg., (MU))

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut.	Total
ECC602	Computer Comm. Networks	03	–	–	03	–	–	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Exam Duration (Hrs.)	Term Work	Practical and Oral	Total
		Internal Assessment			End Sem. Exam.				
		Test 1	Test 2	Avg.					
ECC602	Computer Comm. Networks	20	20	20	80	03	—	—	100

Course pre-requisite :

ECC : 405– Principles of communication engineering

ECC : 501-Digital communication

Course Objectives :

1. To introduce networking architecture and protocols.
2. To understand and recognize the layer-wise functions, services, data formats, protocols, hardware devices and addresses in the TCP / IP architecture
3. To build an understanding of application layer protocols.
4. To apply different addressing and routing schemes.

Module 1

Introduction to Network Architectures, Protocol Layers, and Service models :

Applications of computer networks. **Network types :** LAN, MAN, and WAN, Network topologies. Protocols and standards, Need of layered protocol architecture, OSI reference model. **TCP / IP architecture :** Protocol suite, Comparison of OSI and TCP / IP, Layer wise network hardware devices (NIC, Repeaters, Hubs, Bridges, Switches, Routers, Gateway and Their comparison), **Addressing :** Physical / Logical / Port addressing / Socket addressing. **(Refer Chapter 1)**

Module 2

Physical Layer :

Guided transmission media : Comparison among Coaxial, Optical fiber and Twisted pair cables. Unguided transmission media. Transmission impairments. **Broadband standards :** Cable modem, DSL and HFC.

(Refer Chapter 2)

Module 3

Data Link Layer :

Data link services : Framing, Flow control, Error control, **ARQ methods :** Transmission efficiency, Piggybacking. **High Level Data Link Control (HDLC) :** HDLC configurations, Frame formats, HDLC bit stuffing and De-stuffing, Typical frame exchanges. **Medium Access Control Protocols :** ALOHA, Slotted ALOHA, CSMA, CSMA/CD. **(Refer Chapters 3 and 4)**

Module 4

Network Layer :

Introduction to telephone networks and Circuit switching principles. Introduction to data networks and Packet switching principles. Network layer services and functions. **Internet Protocol :** Principles of Internetworking, requirements, IPv4 packet, IPv4 addressing (Classful and Classless (CIDR)). **Routing in Packet Switching Networks :** Characteristics, Routing strategies. **Routing algorithms :** Link state routing, Distance vector Routing and Path vector routing, **Routing protocols :** RIP, OSPF, BGP and EIGRP. Subnetting, Supernetting, VLSM, and NAT. Introduction to ICMP, ARP, RARP, **IPv6** (IPv6 datagram format, comparison with IPv4 and Transition from IPv4 to IPv6). Quality of service. **(Refer Chapters 5 and 6)**

Module 5

Transport Layer :

Connectionless and Connection-oriented services at transport layer, **Transmission Control Protocol (TCP) :** TCP services, TCP segment, TCP three way handshake., User Datagram Protocol (UDP), UDP services, UDP datagram, TCP and UDP checksum calculation, Flow control, Error control and Congestion control.

(Refer Chapter 7)

Module 6

Application Layer :

Introduction to Application Layer Protocols : HTTP, FTP, DNS, SMTP, TELNET, SSH, DHCP. **(Refer Chapter 8)**

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Module 1

Syllabus : Applications of computer networks. **Network types :** LAN, MAN, and WAN, Network topologies. Protocols and standards, Need of layered protocol architecture, OSI reference model. **TCP / IP architecture :** Protocol suite, Comparison of OSI and TCP / IP, Layer wise network hardware devices (NIC, Repeaters, Hubs, Bridges, Switches, Routers, Gateway and Their comparison), **Addressing :** Physical / Logical / Port addressing / Socket addressing.

Syllabus : Guided transmission media : Comparison among Coaxial, Optical fiber and Twisted pair cables. Unguided transmission media. Transmission impairments. **Broadband standards :** Cable modem, DSL, and HFC.

Module 3

Syllabus : Medium Access Control Protocols : ALOHA, Slotted ALOHA, CSMA, CSMA/CD.

Syllabus : Introduction to telephone networks and Circuit switching principles. Introduction to data networks and Packet switching principles. Network layer services and Functions. **Internet Protocol :** Principles of Internetworking, Requirements, IPv4 packet, IPv4, Addressing (Classful and classless (CIDR)). **Routing in Packet Switching Networks :** Characteristics, Routing strategies. **Routing algorithms :** Link state routing, Distance vector routing and Path vector routing, Subnetting, Supernetting, VLSM and NAT, **IPv6** (IPv6 datagram format, Comparison with IPv4 and Transition from IPv4 to IPv6).

Syllabus : Connectionless and Connection-oriented services at transport layer, **Transmission Control Protocol (TCP) :** TCP services, TCP segment, TCP three way handshake, User Datagram Protocol (UDP), UDP services, UDP datagram, TCP and UDP checksum calculation, Flow control, Error control and Congestion control.

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