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Computer Communication Networks

(Code : ELC603)

Semester VI – Electronics 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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(Semester VI – Electronics Engineering, Mumbai University)

J. S. Katre

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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 Engineering, (MU))

Course Code	Course Name	Teaching Scheme (Hrs.)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut.	Total
ELC603	Computer Comm. Networks	03	–	–	03	–	–	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal Assessment			End Sem. Exam.				
		Test 1	Test 2	Ave. of Test 1 and Test 2					
ELC603	Computer Comm. Networks	20	20	20	80	03	—	—	100

Course pre-requisite :

ELC 404 : Principles of Communication Engineering

ELC 504 : Digital Communication

Course Objectives :

– The objectives of this course are to :

1. Introduce networking architecture and protocols.
2. Understand the various layers and protocols in the TCP/IP model.
3. Recognize different addressing schemes, connecting devices and routing protocols.
4. Select the required protocol from the application layer protocols.

Course Objectives :

– On successful completion of the course the students will be able to :

1. Demonstrate understanding of networking concepts and required protocols.
2. Analyze the various layers and protocols of the layered architecture.
3. Evaluate different addressing schemes, connecting devices and routing protocols.
4. Analyze various routing protocols in Network layer.
5. Understand the various protocols in Transport layer.
6. Comprehend the different protocols in application layer.

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Module 1

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

Introduction to computer networks and it's uses. LAN, MAN, WAN, Network topologies, **Addressing :** Physical / Logical / Port addressing, Protocols and Standards. **Protocol Architecture :** Need of layered protocol architecture, Layers details of OSI, Protocol layers and Their service models. **TCP / IP Model :** Protocol suite, Comparison of OSI and TCP / IP. **(Refer Chapter 1)**

Module 2

Physical Layer :

Transmission Media : Guided media like coaxial, Fiber, Twisted pair and Wireless media, Transmission impairments. **Interconnecting Devices :** Hub, Bridges, Switches, Router, Gateway. **Introduction to LAN :** LAN protocol architecture. **Traditional Ethernet and IEEE 802.3 LAN Standard :** Ethernet protocol, Frame structure, **Physical layers :** LLC, MAC layers. **Multiplexing :** Synchronous TDM, Statistical TDM, ADSL. **(Refer Chapters 2 and 3)**

Module 3

Data Link Control :

Data link services : Framing, Flow control, Error control, ARQ methods, Piggybacking**, High Level Data Link Control (HDLC) :** HDLC configurations, Frame formats, Typical frame exchanges. **Medium Access Control Protocols :** ALOHA, Slotted ALOHA, CSMA, CSMA/CD. **(Refer Chapters 4 and 5)**

Module 4

Network Layer :

Switching : Switched communication networks, Circuit switching networks, **Circuit Switching Concepts :** Crossbar switch, Time Slot Interchange (TSI), TDM bus switching, **Packet switching principles :** Virtual circuit switching and Datagram switching**, Routing in Packet Switching Networks :** Characteristics, Routing strategies, Link state routing, Distance vector routing. **Least-Cost Routing Algorithms :** Dijkstra's algorithm, Bellman Ford algorithm.

Internet protocol :

Principles of Internetworking : Requirements, Connectionless operation, **Internet Protocol Operation :** IP packet, **IP addressing :** Classful and Classless, Subnet and Supernet addressing, IPv4, IPv6 (IPv6 Datagram format, Comparison with IPv4 and Transition from IPv4 to IPv6). **(Refer Chapters 6 and 7)**

Module 5

Transport Layer :

Connection-oriented Transport Protocol Mechanisms : Transmission Control Protocol (TCP) : TCP services, TCP header format, TCP three way handshake, TCP state transition diagram. **Connectionless transport mechanisms :** User Datagram Protocol (UDP) – header. **Congestion :** Effects of congestion, Congestion control methods, Congestion control in packet switching networks. **(Refer Chapter 8)**

Module 6

Application Layer :

HTTP, FTP, DNS, SMTP, Internet Telephony and Streaming Multimedia. **(Refer Chapter 9)**

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Module 1

Syllabus : Introduction to computer networks and it's uses. LAN, MAN, WAN, Network topologies, **Addressing :** Physical / Logical / Port addressing, Protocols and Standards. **Protocol Architecture :** Need of layered protocol architecture, Layers details of OSI, Protocol layers and Their service models. **TCP / IP Model :** Protocol suite, Comparison of OSI and TCP / IP.

Syllabus : Transmission Media : Guided media like coaxial, Fiber, Twisted pair and Wireless media, Transmission impairments. **Interconnecting Devices :** Hub, Bridges, Switches, Router, Gateway.

Module 2

Syllabus : Introduction to LAN : LAN protocol architecture. **Traditional Ethernet and IEEE 802.3 LAN Standard :** Ethernet protocol, Frame structure, **Physical layers :** LLC, MAC layers. **Multiplexing :** Synchronous TDM, Statistical TDM, ADSL.

Syllabus : Data link services : Framing, Flow control, Error control, ARQ methods, Piggybacking**, High Level Data Link Control (HDLC) :** HDLC configurations, Frame formats, Typical frame exchanges.

Syllabus : Switched communication networks, Circuit switching networks, **Circuit Switching Concepts :** Crossbar switch, Time Slot Interchange (TSI), TDM bus switching, **Packet switching principles :** Virtual circuit switching and Datagram switching**, Routing in Packet Switching Networks :** Characteristics, Routing strategies, Link state routing, Distance vector routing. **Least-Cost Routing Algorithms :** Dijkstra's algorithm, Bellman Ford algorithm.

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Syllabus : Connection-oriented Transport Protocol Mechanisms : Transmission Control Protocol (TCP) : TCP services, TCP header format, TCP three way handshake, TCP state transition diagram. **Connectionless transport mechanisms :** User Datagram Protocol (UDP) – header. **Congestion :** Effects of congestion, Congestion control methods, Congestion control in packet switching networks.

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