

**B. E. 2018 Scheme Seventh Semester Syllabus (EC)**  
**Choice Based Credit System (CBCS) and Outcome Based Education (OBE)**

**SEMESTER – VII**  
**COMPUTER NETWORKS**

Course Code	: 18EC71	CIE Marks	: 40
Lecture Hours/Week	: 3	SEE Marks	: 60
Total Number of Lecture Hours	: 40 (08 Hrs/module)	Exam Hours	: 03
CREDITS – 03			

**Course Learning Objectives:** This course will enable students to:

- Understand the layering architecture of OSI reference model and TCP/IP protocol suite.
- Understand the protocols associated with each layer.
- Learn the different networking architectures and their representations.
- Learn the functions and services associated with each layer.

**Module-1**

**Introduction:** Data communication: Components, Data representation, Data flow, Networks: Network criteria, Physical Structures, Network types: LAN, WAN, Switching, The Internet.

**(1.1,1.2, 1.3(1.3.1to 1.3.4 of Text)**

**Network Models:** Protocol Layering: Scenarios, Principles, Logical Connections, TCP/IP Protocol Suite: Layered Architecture, Layers in TCP/IP suite, Description of layers, Encapsulation and Decapsulation, Addressing, Multiplexing and Demultiplexing, The OSI Model: OSI Versus TCP/IP.

**(2.1, 2.2, 2.3 of Text)**

**L1, L2**

**Module-2**

**Data-Link Layer:** Introduction: Nodes and Links, Services, Two Categories' of link, Sublayers, Link Layer addressing: Types of addresses, ARP. Data Link Control (DLC) services: Framing, Flow and Error Control, Data Link Layer Protocols: Simple Protocol, Stop and Wait protocol, Piggybacking.

**(9.1, 9.2(9.2.1, 9.2.2), 11.1, 11.2of Text)**

**Media Access Control:** Random Access: ALOHA, CSMA, CSMA/CD, CSMA/CA.(12.1 of Text)

**Wired and Wireless LANs:** Ethernet Protocol, Standard Ethernet. Introduction to wireless LAN: Architectural Comparison, Characteristics, Access Control.

**(13.1, 13.2(13.2.1 to 13.2.5), 15.1 of Text)**

**L1,L2, L3**

### Module-3

**Network Layer:** Introduction, Network Layer services: Packetizing, Routing and Forwarding, Other services, Packet Switching: Datagram Approach, Virtual Circuit Approach, IPV4 Addresses: Address Space, Classful Addressing, Classless Addressing, DHCP, Network Address Resolution, Forwarding of IP Packets: Based on destination Address and Label.

**(18.1, 18.2, 18.4, 18.5.1, 18.5.2 of Text)**

**Network Layer Protocols:** Internet Protocol (IP): Datagram Format, Fragmentation, Options, Security of IPv4 Datagrams. **(19.1 of Text)**.

**Unicast Routing:** Introduction, Routing Algorithms: Distance Vector Routing, Link State Routing, Path vector routing.

**(20.1, 20.2 of Text)**

**L1, L2, L3**

### Module-4

**Transport Layer:** Introduction: Transport Layer Services, Connectionless and Connection oriented Protocols, Transport Layer Protocols: Simple protocol, Stop and wait protocol, Go-Back-N Protocol, Selective repeat protocol. **(23.1, 23.2.1, 23.2.2, 23.2.3, 23.2.4 of Text)**

**Transport-Layer Protocols in the Internet:**

User Datagram Protocol: User Datagram, UDP Services, UDP Applications, Transmission Control Protocol: TCP Services, TCP Features, Segment, Connection, State Transition diagram, Windows in TCP, Flow control, Error control, TCP congestion control.

**(24.2, 24.3.1, 24.3.2, 24.3.3, 24.3.4, 24.3.5, 24.3.6, 24.3.7, 24.3.8, 24.3.9 of Text)**

**L1, L2, L3**

### Module-5

**Application Layer:** Introduction: providing services, Application- layer paradigms, Standard Client –Server Protocols: World wide web, Hyper Text Transfer Protocol, FTP: Two connections, Control Connection, Data Connection, Electronic Mail: Architecture, Web Based Mail, Telnet: Local versus remote logging. Domain Name system: Name space, DNS in internet, Resolution, DNS Messages, Registrars, DDNS, security of DNS.

**(25.1, 26.1, 26.2, 26.3, 26.4, 26.6 of Text)**

**L1, L2**

**Course Outcomes:** At the end of the course, the students will be able to:

1. Understand the concepts of networking.
2. Describe the various networking architectures.
3. Identify the protocols and services of different layers.
4. Distinguish the basic network configurations and standards associated with each network.
5. Analyze a simple network and measure its parameters.

**Question paper pattern:**

- Examination will be conducted for 100 marks with question paper containing 10 full questions, each of 20 marks.
- Each full question can have a maximum of 4 sub questions.
- There will be 2 full questions from each module covering all the topics of the module.
- Students will have to answer 5 full questions, selecting one full question from each module.
- The total marks will be proportionally reduced to 60 marks as SEE marks is 60.

**TEXT BOOK:**

- Behrouz A Forouzan, “Data Communications and Networking”, 5<sup>th</sup> Edition, McGraw Hill, 2013, ISBN: 1-25-906475-3.

**REFERENCE BOOKS:**

1. James J Kurose, Keith W Ross, “Computer Networks”, Pearson Education.
2. Wayne Tomasi, “Introduction to Data Communication and Networking”, Pearson Education.
3. Andrew S Tanenbaum, “Computer Networks”, Prentice Hall.
4. William Stallings, “Data and Computer Communications”, Prentice Hall.