

| Course Code | Course Name                         | Teaching Scheme |           |          | Credits Assigned |           |          |       |
|-------------|-------------------------------------|-----------------|-----------|----------|------------------|-----------|----------|-------|
|             |                                     | Theory          | Practical | Tutorial | Theory           | Practical | Tutorial | Total |
| EXC704      | Computer Communication and Networks | 04              | --        | --       | 04               | --        | --       | 04    |

| 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 |               |   |           |           |      |       |
| EXC704      | Computer Communication and Networks | 20                  | 20     | 20                        | 80            | - | -         | -         | 100  |       |

**Pre requisite :**

- EXC 405: Fundamentals of Communication Engineering
- EXC:504: Digital Communication

**Course Objective:**

1. To ensure that students have the necessary networking skills to design, implement and analyze communication networks.
2. Students will be able to design, implement, and analyze communication networks.

**Course Outcome:** After Completing this course student will be able to

1. Understand the fundamentals of communication and Computer networks.
2. Have the capability of designing and analyzing data transmission protocols and data link control protocols.
3. Able to discuss major trends in industry and current research activities within the discipline.
4. Able to implement networking protocols using TCP/IP based on socket programming.

| <b>Module No.</b> | <b>Unit No.</b> | <b>Topics</b>  | <b>Hrs.</b> |
|-------------------|-----------------|--|-------------|
| <b>1.</b>         |                 | <b>Introduction to Network Architectures, Protocol Layers, and Service models</b>  | <b>10</b>   |
|                   | <b>1.1</b>      | Network Hardware: Topologies, LAN, MAN, WAN, Wireless network, Home Network, Internetworks, Virtual LANs   |             |
|                   | <b>1.2</b>      | Network Software: Protocol Hierarchies, Design Issues for the layers, Connection oriented and connectionless Services  |             |
|                   | <b>1.3</b>      | Reference Models: Layers details of OSI, TCP/IP Models, Protocol Layers and Their Service Models   |             |
| <b>2</b>          |                 | <b>Physical-layer Services and Systems</b>   | <b>08</b>   |
|                   | <b>2.1</b>      | Introduction to physical media, Coax, fiber, twisted pair, DSL, HFC  |             |
|                   | <b>2.2</b>      | Data link layer services and protocols: Link-layer and its services, Ethernet, hubs, bridges, and switches, Link- layer addressing, Error-detection and error-correction. Parity, check-summing, CRC, Manchester encoding. Aloha protocols, Control Access Protocol, Carrier Sense |             |
|                   | <b>2.3</b>      | Multiple Access (CSMA), Local Area Networks - Ethernet, Token ring, FDDI. WiMax, cellular, satellite, and telephone networks, Bit transmission, Frequency division multiplexing. Time division multiplexing  |             |
| <b>3</b>          |                 | <b>Data Link Layer Protocol</b>  | <b>10</b>   |
|                   | <b>3.1</b>      | PPP, HDLC, Stop and wait protocol  |             |
| <b>4</b>          |                 | <b>Network Layer Services and Protocols</b>  | <b>10</b>   |
|                   | <b>4.1</b>      | Switching fabric, Routing and forwarding, Queues and buffering, Virtual-circuit and datagram networks, Internet protocol   |             |
|                   | <b>4.2</b>      | IPv4 and IPv6, Tunneling, LS and DV algorithms. Routing in the Internet, RIP, OSPF, and BGP  |             |
|                   | <b>4.3</b>      | Broadcast and multicast, Handling mobility   |             |
| <b>5</b>          |                 | <b>Reliable and Unreliable Transport-layer Protocols</b>   | <b>08</b>   |
|                   | <b>5.1</b>      | GBN and SR. TCP and UDP. Port numbers, Multiplexing and de-multiplexing  |             |
|                   | <b>5.2</b>      | Flow control and congestion control. Fairness, Delay, jitter, and loss in packet-switched networks   |             |
|                   | <b>5.3</b>      | Bandwidth, throughput, and quality-of-service  |             |
| <b>6</b>          |                 | <b>Principles of Network Applications.</b>   | <b>06</b>   |
|                   | <b>6.1</b>      | Application layer protocols such as HTTP, FTP, and SMTP,   |             |
|                   | <b>6.2</b>      | Peer-to-Peer File Sharing Protocols and Architectures, ISPs and Domain name systems, Socket API and network socket programming   |             |
| <b>Total</b>      |                 |  | <b>52</b>   |

### **Recommended Books:**

1. B. A. Forouzan, "Data Communications and Networking", TMH, Fourth Edition.
2. S. Tanenbaum, "Computer Networks", Pearson Education, Fourth Edition.
1. Computer Networking: A Top-Down Approach, by J. F. Kurose and K. W. Ross, Addison Wesley, 5th Edition, March 2009, ISBN-13: 978-0136079675.

### **Internal Assessment (IA):**

Two tests must be conducted which should cover at least 80% of syllabus. The average marks of both the test will be considered as final IA marks

### **End Semester Examination:**

1. Question paper will comprise of 6 questions, each of 20 marks.
2. Total 4 questions need to be solved.
3. Question No.1 will be compulsory and based on entire syllabus wherein sub questions of 2 to 5 marks will be asked.
4. Remaining questions will be selected from all the modules