Institute of Computer Science/Information Technology (ICS&IT)
Faculty of Management Sciences & CS/IT (FMCS)
The University of Agricultural Peshawar

Programme:	BS (CS)-6
Course Name:	Computer Networks
Course Code:	CC-511
Credit Hours:	03
Course Week:	16
Total Hours:	48

Course Objectives

To introduce students to the concept of computer communication, Analogue and Digital Transmission, Network Layers, Network models (OSI & TCP/IP) and Protocol standards. Emphasis is given on the understanding of modern network concepts.

Week-1:

- Introduction:
- Fundamental Characteristics of Data Communication and Computer Networks
- Data Communication Components
- Protocol & Standards

Week-2:

- Basic Concepts:
- Line Configuration
- Topologies
- Transmission modes
- Networks:
- Network Criteria

Week-3:

- Categories of Networks:
- Key Terms & Concepts
- Local Area Network (LAN)
- Metropolitan Area Network (MAN)
- Wide Area Network (WAN)
- Wireless Local Area Network (WLAN)

Week-4 & 5:

- The OSI Model:
- Layered Architecture
- Functions of the Layers

Week-6 & 7:

- Transmission Control Protocol/Internet Protocol:

- TCP/IP Protocol Suite
- Functions of the Layers
- Routing & Bridging

Week-8:

- IP Addresses:
  - Types of IP Addresses
  - IP Address Classes
- TCP/IP Utilities

Week-9:

- Networking Devices
  - Hub
  - Switch
  - Router
  - Gateway

Week-10:

- Analog and Digital Transmission:
- Analog and Digital Data
- Analog and Digital Signal
- Periodic & Non-periodic Signals
- Analog and Digital Transmission Fundamentals:
- Analog and Digital Representation of Information
- Characterization of Communication Channels:
  - Analog Characterization
  - Digital Characterization

Week-11:

- Time & Frequency Domain
- Fundamental Limits in Digital Transmission:
  - Data Rate Limits
  - Signal-to-Noise Ratio (SNR or S/N)
  - Shannon Channel Capacity/Noisy Channel
  - Nyquist Bit Rate/Noiseless Channel

Week-12:

- Encoding:
- Digital to Digital Conversion:
  - Unipolar
  - Polar
  - Bipolar
- Analog to Digital Conversion:
  - Pulse Amplitude Modulation (PAM)
  - Pulse Code Modulation

Week-13:

- Digital to Analog Conversion:

- Amplitude Shift Keying (ASK)
- Frequency Shift Keying (FSK)
- Phase Shift Keying (PSK)

- Analog to Analog Conversion

Week-14:

- Transmission Media:
- Guided Media
- Unguided Media

- Transmission Impairment:
  - Attenuation, Decibel, Distortion, & Noise

Week-15:

- Multiplexing:
- Frequency Division Multiplexing
- Wave Length Division Multiplexing
- Time Division Multiplexing

- Digital Subscriber Line

Week-16:

- Latest Trends in Computer Networks

Total Marks: 100

Recommended Books:

1. Data communications and networking by Behrouz A. Forouzan. — 5th edition., ISBN 978-0-07-337622-6 (alk. paper)

2. Communication Networks by Leon Garcia & Widjaja
3.