

Teaching Guidelines for
Computer Networking & Interconnects
ACC-HPC June 2025

Duration: 48 hours (24 theory hours + 24 lab hours)

Evaluation: 100 marks

Weightage: CCEE – 40%, Lab exam – 40%, Internals – 20%

Textbook:

- Data Communications and Networking, Behrouz A. Forouzan, McGraw-Hill Education
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Session 1:

- Internetworking
- OSI model
- Ethernet
- Wireless Networking

Assignment:

- Difference between UTP & STP
- Write categories of cables
- e in CAT5e
- OSI Model

Session 2:

- Internet Protocol
- TCP/IP model

Assignment:

- IP
- TCP/IP Model
- Write a difference between TCP & UDP.

Session 3:

- IP Subnetting & Variable Length Subnet Masking

Assignment:

- Subnetting
- Determine the network and host part of 192.168.5.85 /24, 10.128.240.50/30 address.
- Divide the network as per the following requirement: 192.168.1.0/24
 - Subnet 1 =28 hosts
 - Subnet 2 =52 hosts
 - Subnet 3 =15 hosts
 - Subnet4 = 5 hosts

Session 4:

- Router IOS & Security Device Manager

Assignment:

- Subnet the Class C IP Address 195.1.1.0 So that you have 10 subnets each with a maximum 12 hosts on each subnet. List the Address on host 1 on subnet 0,1,2,3,10.
- Divide the network to find 500 hosts in each subnet. 152.152.0.0 /16

Session 5:

- Managing an Internetworking Router

Lab Assignments:

- Working with Router Booting, configuration registers, Router IOS, Telnet, Resolving Hostname, and Debugging.

Session 6:

- Implementing Routing Protocols

Lab Assignments:

- Implementation of Static Routing, RIP, IGRP, EIGRP, OSPF

Session 7:

- Layer 2 switching

Theory Assignment:

- Spanning Tree Protocol (STP)?
- Write types of Spanning Tree Protocol (STP).
- priority number of Spanning Tree Protocol (STP)
- disable Spanning Tree Protocol (STP)

Lab Assignments:

- Configuration of switch, STP
- Create the following topology for STP and configure a specific switch as root bridge by changing priority number.

Session 8:

- Virtual LANs

Lab Assignments:

- Configure, verify, and troubleshoot VLANs (normal/extended range) spanning multiple switches, inter-VLAN routing
- Create the following topology where Switch 1 is Server mode and switch 2,3,4,5 are client mode. Use network 192.168.10.0 /24
 - Transfer the VLAN info from the server to all clients.
 - Assign a VLAN as mention in the topology.
 - PC's in having same VLAN should ping each other.
- Create the following topology where Switch 1 is Server mode and Switches 2,4, are client mode. Use network 192.168.1.0 /24
 - Transfer the VLAN info from the server to all clients.
 - Assign a VLAN as mention in the topology.
 - PC's in having same VLAN should ping each other.
 - Configured switch 3 in transfer mode and transferred vlan information to switch 4

Session 9:

- NAT
- IPV6

Lab Assignments:

- NAT configuration, Configuring Routers with IPv6.

Session 10:

- OmniPath Architecture
- Omnipath Packet Structure
- Infiniband Architecture
- Infiniband Packet Structure

Session 11:

- Storage Devices
- Types of HDD
- RAID and RAID Levels
- File Systems(Windows and Linux)
- Network File System.
- DAS/NAS/SAN

Session 12:

Parallel File System

- Introduction
- Classification
- Ceph File System Architecture and Components
- GPPFS features and architecture.
- Lustre File System Architecture and Components
- Comparison of File systems