

310 CNE Course Syllabus

Course Code	310 CNE
Course Name	Computer Networks
Credit Hours	3
Contact Hours	4
Instructor Name	Eng. Mohammad A. Aty

Text Book (title, author, and year)

- Tanenbaum, Computer Networks Latest Edition, Prentice Hall (October 7, 2010)
- James F. Kurose and Keith W. Ross, Computer Networking A Top-Down Approach Featuring the Internet, Latest Edition, Prentice Hall (July 17, 2002).

Specific Course Information

Catalog Description	This course is focus on the principles, design, implementation, and performance of computer networks. It introduces Internet protocols, switching, routing, VLAN, and WAN networks like ISDN and Frame relay.
Prerequisites	CNE220 –Data Communications
Co-requisites	NIL
Required/Elective	required

Course Learning Outcomes

1	To define the concept for designing subnets, IP addressing, and outline the mathematical skills for implementing classful and classless network addressing.
2	To describe VLANs principle and advantages, and describe the standard network communication protocols such as intra-VLAN 802.1Q, and Inter VLAN routing sub-interfaces
3	To plan and design LAN and WAN networks and troubleshoot their problems, and apply WAN protocols (PPP, FRAME-RELAY) for optimal connectivity.
4	To explain the importance of computer networks for economic and society services and highlight the recent advances in networking design and protocols
5	To show the ability to learn modern techniques and skills in networking for designing optimum network solutions for real life applications.
6	To demonstrate the ability to conduct a team work projects for designing and implementing a complete LAN project.
7	To demonstrate the ability to seek and obtain new protocols and technologies in computer networking.
8	To demonstrate the ability to communicate orally to describe recent advances in networking.

Mapping course LOs to the SLO.

Course LOs #	Student Learning Outcomes											
	a1	a2	b1	b2	b3	b4	b5	c1	c2	c3	d1	d2
1	√											
2			√									
3			√	√								
4			√	√								
5					√							
6								√				
7										√		
8												√

List of Theory Topics

Standard Network Architecture: Layers, IP Address IPV4, IPV6 (Classful Addressing, Classless Addressing, Supernetting, CIDR (classless Interdomain Routing, Supernetting))

Switches and routers: Collision Domain, Broadcast Domain, Catalyst Switch Operations.

Redundant topology (Redundant problems): STP protocol, and RSTP protocol

VLAN: Trunks and VTP (Local VLANs, Static VLANs, Configuring VLANs, 802.1Q Trunking, Importance of Native VLANs)

Basic concept of DHCP, DNS, NAT, PAT protocols

WAN: WAN Devices, WAN Standards Organizations, WANs - Data Link Encapsulation. HDLC Encapsulation, PPP protocols, Configuring PPP.

ISDN: definition, physical and data link layers, interfaces and reference points for ISDN

Frame Relay: components, topologies, configuration, Frame Relay Permanent Virtual Circuit (PVC), creating a Frame Relay Map on a remote network.

List of Lab Experiments

1. IP Addressing (class A,B,C,D,E)
2. Implementing Subnet mask and Classfull Addressing
3. Implementing Subnetting/Supernetting and Variable Length Subnet Mask
4. Network design
5. Switch Configuration
6. STP, RSTP
7. Basic VLAN Configuration (create VLAN, switch port, trucking)
8. Inter-VLAN Routing(802.1Q Trunking, sub interfaces)
9. NAT, PAT, DHCP protocols configuration
10. WAN connections (HDLC Configuring, PPP Configuring, Configuring Frame Relay PVC)
11. IETF Frame Relay Frame, DLCI, LMI – Local Management Interface, Inverse ARP
12. Frame Relay Encapsulation, and Configuration
13. A Frame-Relay Configuration Supporting Multiple Sites