Virginia Western Community College
TEL 251
Internetworking IV

Prerequisites
TEL 250

Course Description
Focuses on the differences between the following WAN services: LAPB, Frame Relay, ISDN/LAP HDLC, PPP, and DDR

Semester Credits: 4 Lecture Hours: 3 Lab/Clinical/Internship Hours: 3

Required Materials

Textbook:
CCNA Routing & Switching Portable Command Guide, Author: Scott Empson, 4th ed., ISBN: 9781587205880
All reading material is located on netacad.com

Other Required Materials:
Packet Tracer Software (available from the class website)

Course Outcomes

At the completion of this course, the student should be able to:

- Explain network technologies.
- Implement access control lists (ACLs) to filter traffic.
- Configure Ethernet switch ports.
- Design a small multi-site business network.
- Select WAN access technologies.
- Configure a serial interface to enable WAN communication.
- Configure an Ethernet interface to enable broadband communication given service provider requirements.
- Implement remote access and site-to-site VPNs.
- Use monitoring tools and network management protocols to troubleshoot data networks.
- Configure monitoring tools available for small to medium-sized business networks.
- Configure initial settings on a network device.
- Explain how quality of service (QoS) mechanism support network communication requirements.

Topical Description

Ch.	Connection Networks		Objectives
1	**WAN Design**		
	1.1	WAN Technologies Overview	Explain WAN access technologies available to small to medium-sized business networks.
	1.2	Selecting a WAN Technology	Select WAN access technologies to satisfy business requirements.
2	**Point-to-Point Connections**		
	2.1	Serial Point-to-Point Overview	Configure HDLC encapsulation.
	2.2	PPP Operation	Explain how PPP operates across a point-to-point serial link.
	2.3	Configure PPP	Configure PPP encapsulation.
	2.4	Troubleshooting PPP	Troubleshoot PPP.
3	**STP**		
	3.1	Remote Access Connections	Select broadband remote access technologies to support business requirements.
	3.2	PPPoE	Configure a Cisco router with PPPoE.
	3.3	VPNs	Explain how VPNs secure site-to-site and remote access connectivity.
	3.4	GRE	Implement a GRE tunnel.
	3.5	eBGP	Implement eBGP in a single-homed remote access network.
4	**Access Control Lists**		
	4.1	Standard ACL Operation and Configuration Review	Standard ACL Operation and Configuration Review
	4.2	Extended IPv4 ACLs	Configure extended IPv4 ACLs.
	4.3	IPv6 ACLs	Configure IPv6 ACLs.
	4.4	Troubleshoot ACLs	Troubleshoot ACLs.
5	**Network Security and Monitoring**		
	5.1	LAN Security	Explain how to mitigate common LAN security attacks.

	5.2	SNMP	Configure SNMP to monitor network operations in a small to medium-sized business network.
	5.3	Cisco Switch Port Analyzer (SPAN)	Troubleshoot a network problem using SPAN.
6	**Quality of Service**		
	6.1	QoS Overview	Explain the purpose and characteristics of QoS.
	6.2	QoS Mechanisms	Explain how networking devices implement QoS.
7	**Network Evolution**		
	7.1	Internet of Things	Explain the value of the Internet of Things.
	7.2	Cloud and Virtualization	Explain why cloud computing and virtualization are necessary for evolving networks.
	7.3	Network Programing	Explain why network programmability is necessary for evolving networks.
8	**Network Troubleshooting**		
	8.1	Troubleshooting Methodology	Explain troubleshooting approaches for various network problems.
	8.2	Troubleshooting Scenarios	Troubleshoot end-to-end connectivity in a small to medium-sized business network, using a systematic approach.

Notes to Instructors

- All instructors are to use a combination of Packet Tracer and hands on labs (via classroom equipment or the Netlab+ online lab server)
- Assignments consist of labs, quizzes, chapter tests, skills based exam, and a final exam