BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

CSCI 56 - Cisco Networks Level 3 & 4, Scaling and Connecting   **3 Unit(s)**

Prerequisite(s): CSCI 53
Recommended Prep: NONE

Transfer Status: CSU
34 hours Lecture
51 hours Lab

This is an intermediate level course in computer networks that enables students to understand the selection criteria of network devices and WAN technologies to meet network requirements. The focus of this course is scaling and connecting networks through WAN technologies. It describes the architecture, components and advanced operations of routers and switches, and the network services required by converged applications in a large and complex network. It is the third of three courses designed to prepare students to take the Cisco Certified Network Associate (CCNA) exam. This course will provide students with the skills and knowledge required to analyze, design, build, and maintain small to medium-sized networks; troubleshoot data link and routing protocols and network services. Topics include: Local Area Network (LAN) switching and design, Virtual Local Area Networks (VLANs), trunking protocols, wireless concepts and configuration, WAN fundamentals and protocols, Internet Protocol (IP) addressing services, network security, Access Control Lists (ACLs), and troubleshooting.

II. **OBJECTIVES**

Upon successful completion of this course, the student will be able to:
   A. Design, build, configure, and maintain small to medium-sized networks utilizing switches and WAN connections.
   B. Describe and analyze the advantages of LAN segmentation using switches, and routers.
   C. Describe and analyze networking congestion and latency problems in an Ethernet network.
   D. Describe, explain the benefits of, and configure VLANs.
   E. Explain the purpose and use of the Spanning Tree Protocol (STP).
   F. Describe the benefits of monitoring a network using Syslog, Simple Network Management Protocol (SMNP) and NetFlow.
   G. Analyze and differentiate between different WAN services: Point-to-Point Protocol (PPP), High-Level Data Link Control (HDLC), and Frame Relay.
   H. Explain basic wireless concepts.
   I. Configure a secure site to site connection.
   J. Analyze, compare, and configure routing protocols including Frame Relay, Open Shortest Path First (OSPF) and Enhanced Interior Gateway Routing Protocol (EIGRP).

III. **COURSE CONTENT**

   A. **Unit Titles/Suggested Time Schedule**

Lecture

Topics	Hours
1. Introduction to Scaling Networks	2.00
2. Managing LAN Redundancy with Spanning Tree Protocol (STP)	2.00
3. Link Aggregation	2.00
4. Wireless LANs	2.00
5. Adjust and troubleshoot Single-Area OSPF	2.00

6.	Multi-Area OSPF	2.00
7.	EIGRP	2.00
8.	Cisco IOS Images and Licensing	1.00
9.	EIGRP Advanced Configurations and Troubleshooting	2.00
10.	Hierarchical Network Design	2.00
11.	Connecting to the WAN	2.00
12.	Point to Point Connections	2.00
13.	Frame Relay	2.00
14.	Network Address Translation for IPv4	2.00
15.	Broadband Solutions	1.00
16.	Securing Site to Site Connectivity	2.00
17.	Monitoring the Network	1.00
18.	Troubleshooting the Network	1.00
19.	Network Security	2.00
	Total Hours	34.00

<div align="center">Lab</div>

Topics		Hours
1.	Introduction to Scaling Networks	2.00
2.	Managing Lan Redundancy with Spanning Tree Protocol (STP)	3.00
3.	Link Aggregation	3.00
4.	Wireless LANs	2.00
5.	Adjust and Troubleshoot Single-Area OSPF	3.00
6.	Multi-Area OSPF	3.00
7.	EIGRP	4.00
8.	EIGRP Advanced Configurations and Troubleshooting	4.00
9.	Cisco IOS Images and Licensing	1.00
10.	Hierarchical Network Design	3.00
11.	Connecting to the WAN	3.00
12.	Point to Point Connections	3.00
13.	Frame Relay	3.00
14.	Network Address Translation for IPv4	3.00
15.	Broadband Solutions	3.00
16.	Securing Site to Site Connectivity	3.00
17.	Monitoring the Network	2.00
18.	Troubleshooting the Network	3.00
	Total Hours	51.00

IV. **METHODS OF INSTRUCTION**
    A. Lecture
    B. Class Activities
    C. Homework: Students are required to complete two hours of outside-of-class homework for each
       hour of lecture

D. Discussion
 E. Demonstrations
 F. Problem-Solving Sessions
 G. Reading Assignments
 H. Multimedia Presentations
  I. Laboratory Experiments

V. **METHODS OF EVALUATION**
A. Exams/Tests
B. Quizzes
C. Projects
D. Homework
 E. Lab Projects
 F. Written Examinations
 G. Performance Examinations

VI. **EXAMPLES OF ASSIGNMENTS**
A. Reading Assignments
1. Read the white paper provided on MPLS, enumerate the benefits and be prepared to discuss it in class.
2. Read the link on IOS images for routers. Be prepared to explain the different licensing levels.
B. Writing Assignments
1. Write a 1-2 page paper explaining how Multiarea OSPF effectively partitions a large single network into multiple areas.
2. Research available WAN connectivity and services. Write a 1-2 page paper comparing and contrasting services and costs.
C. Out-of-Class Assignments
1. Using Packet Tracer, create a WAN with four routers, six switches, and ten workstations. Verify connectivity by pinging from one end to the other.
2. Research Backbone and regular/non-Backbone area OSPF. Be prepared to discuss implementation options in class.

VII. **RECOMMENDED MATERIALS OF INSTRUCTION**
Textbooks:
A. Johnson, Allan. Scaling Networks Companion Guide. Cisco Press, 2014.
B. Cisco Network Academy. Netacad. Cisco Press, 2015.
C. Vachon, B., Graziani, R. Connecting Networks Companion Guide. Cisco Press, 2014.

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