A. Protocol

Course Name: CISCO CCNA 4
Course Number: CIS 344
Credits: 4 (2 hours lecture, 3 hours lab)
Prerequisites: CIS 343 with a C- or better
Maximum Class Size (face-to-face): 24
Maximum Class Size (online): 35
*Justification for online class size is due to the highly-technical nature of the course.

B. Objectives of the Course:
Upon completion of this course the student will be able to:

a. Design and configure various WAN devices.
b. Compare and contrast NAT and PAT.
c. Troubleshoot common network problems involving WANs.

C. Catalog Description:
This course is designed for the Information Systems major. It is the fourth in a series of four CCNA courses. It provides the student with a thorough understanding of Wide Area Network (WAN) technologies and their role in computer networking. Prerequisite: CIS 343 with a C- or better. Four credits.

D. Outline of the Course:
1) Scaling Networks with Network Address Translation (NAT) and Port Address Translation (PAT)
   a. Private addressing
   b. Features of NAT
   c. Features of PAT
   d. Configuring NAT
   e. Configuring PAT
   f. Troubleshooting NAT
   g. Troubleshooting PAT
   h. Issues with NAT
2) Dynamic Host Configuration Protocol (DHCP)
   a. BOOTP and DHCP differences
   b. DHCP Features
   c. DHCP Operation
   d. Configuring DHCP
   e. Troubleshooting DHCP
   f. DHCP Relay
3) WAN technologies
   a. Devices
   b. Standards
   c. Encapsulation
   d. Packet and circuit switching
   e. Link options
4) WAN design
a. WAN communication  
b. Identifying and selecting network capabilities  
c. Three-layer design model  
d. Other layered design models  
e. Design considerations  

5) Serial Point-to-Point Links  
a. Time-division multiplexing  
b. Demarcation point  
c. DTE / DCE  
d. HDLC encapsulation  
e. Configuring HDLC encapsulation  
f. Troubleshooting a serial interface  

6) PPP Authentication  
a. PPP layered architecture  
b. Establishing a PPP session  
c. PPP authentication protocols  
d. Password Authentication Protocol  
e. Challenge Handshake Authentication Protocol  

7) Configuring and troubleshooting PPP  

8) ISDN  
a. Standards and access methods  
b. Protocols  
c. Functions  

9) Frame Relay  
a. Stack layered support  
b. Bandwidth and flow control  
c. Address mapping and topology  
d. LMI  
e. Stages of Inverse ARP and LMI operation  
f. Configuring frame relay  
   i. Reachability issues  
   ii. Subinterfaces  
   iii. Troubleshooting  

10) Teleworker services  
a. Technologies used to connect to the WAN  
b. VPNs  

11) Network management vulnerabilities  
a. OSI and network management model  
b. SNMP protocol  
c. SNMP operation  
d. Telnet  
e. SSH  
f. CDP  

E. Teaching Methodology:  

1) Traditional Classroom Methodology  

This course will be taught using some lecture/discussion method followed with a majority of class time using hands-on lab activities on the presented concepts. Some cooperative group method will be employed during appropriate sections of the course.  

2) Online Methodology  

This course will be taught using a variety of methods including lecture videos, activities, group collaborative learning, and discussion boards.
Quality Matters™ Statement – The online course follows the standards of the Quality Matters™ rubric. An online homework system is required in this course.

F. Text

All material will be provided online via the CISCO Networking Academy Website (cisco.netacad.net).

G. Assessment Activities:

1) Traditional Classroom Assessment

Various assessment methods are used, at the discretion of the instructor, and can include exams, quizzes, tutorials, homework assignments, programs/projects/labs. An online homework submission system is used in this course.

2) Online Assessment

Various assessment methods are used, at the discretion of the instructor, and can include exams, quizzes, tutorials, homework assignments, programs/projects, wikis, online journals and labs. An online homework system is required in this course.

H. Accommodations for Students with Disabilities:

OSD
Revised December 2012

STUDENTS WITH DISABILITIES

Students with disabilities:

• Reserve the right to decide when to self-identify and when to request accommodations.

• Will register with the Office for Students with Disabilities (OSD) each semester to receive accommodations.

• Might be required to communicate with faculty for accommodations, which specifically involve the faculty.

• Will present the OSD Accommodation Approval Notice to faculty when requesting accommodations that involve the faculty.

Office for Students with Disabilities

Requests for approval for reasonable accommodations should be directed to the Office for Students with Disabilities (OSD). Approved accommodations will be recorded on the OSD Accommodation Approval notice and provided to the student. Students are expected to adhere to OSD procedures for self-identifying, providing documentation and requesting accommodations in a timely manner.

Contact Information:

• Location: Azorsky Building – Room 105
• Phone: (724) 938-5781
• Fax: (724) 938-4599
• Email: osdmail@calu.edu
I. Supportive Instructional Materials, e.g. library materials, web sites, etc.

**Library Materials:**
Books located in the PILOT catalogs, library databases (Ebscohost, CIOS, Proquest, Lexis-Nexis) which include books, journals, magazines, and newspapers. Examples of holdings at the Louis L. Manderino Library are:


Hayden, Matt, *Teach yourself networking in 24 hours* (Indianapolis, IN: Sams Pub. 1998)


A. Supportive Instructional Materials, e.g. library materials, web sites, etc.

Books located in the PILOT catalogs, library databases (Ebscohost, CIOS, Proquest, Lexis-Nexis) which include books, journals, magazines, and newspapers.
J. Proposed Instructors: Dr. Gina Boff, Dr. Gary DeLorenzo, Dr. Lisa Kovalchick, Dr. Tony Rodi or any other tenure-track CIS faculty from the Department of Mathematics, Computer Science and Information Systems.

K. Rationale for Course: Course already exists and being updated for Global Online delivery.

L. Specialized Equipment or Supplies Needed: None

M. Answer the following questions using complete sentences:

1. Does the course require additional human resources? No, the course is already being taught.

2. Does the course require additional physical resources? No. The current physical resources on campus can accommodate the teaching of this course.

3. Does the course change the requirements in any particular major? No.

4. Does the course replace an existing course? No, this course does not replace any existing courses.

5. How often will the course be taught? This course will be taught once every year.

6. Does the course duplicate an existing course in another Department or College? No.

7. What is the recommended maximum class size for this course? Recommended class size for this course is 35 for online sections, due to the highly-technical nature of the course.

N. If the proposed course includes substantial material that is traditionally taught in another discipline, you must request a statement of support from the department chair that houses that discipline. This course does not include substantial material from another discipline.

O. Please identify if you are proposing to have this course considered as a menu course for General Education. If yes, justify and demonstrate the reasons based on the categories for General Education. The General Education Committee must consider and approve the course proposal before consideration by the UCC. No; this course will not be offered on the GenEd menu.