CENTRAL TEXAS COLLEGE
SYLLABUS FOR ITCC 1401
CCNA1: EXPLORATION-NETWORK FUNDAMENTALS
SEMESTER HOURS CREDIT: 4

Instructor: __________________________

Office Hours: ________________________

I. INTRODUCTION

A. Local Area Networking and Design Protocols provide the foundation for networkers worldwide. As the leading manufacturer and provider of the world’s gateway to the Internet, Cisco has become an industry standard of today. Cisco has designed and created course material that is being used in classrooms to provide the basic knowledge of networking as well as empowering the student to understand the future needs in networking technology.

B. This course will acquaint the student with the basic networking vocabulary and help him to understand most networking protocols. The student will be able to compile network addresses, understand networking topologies, protocols and the media used. The student will also understand the basic design standards used in installing and configuring Local Area Networks.

C. Departmental approval is required.

II. LEARNING OUTCOMES

Upon successful completion of this course, the student will be able to:

A. Explain the importance of data networks and the Internet in supporting business communications and everyday activities
B. Explain how communication works in data networks and the Internet
C. Recognize the devices and services that are used to support communications across an Internetwork
D. Use network protocol models to explain the layers of communications in data networks
E. Explain the role of protocols in data networks
F. Describe the importance of addressing and naming schemes at various layers of data networks
G. Describe the protocols and services provided by the application layer in the OSI and TCP/IP models and describe how this layer operates in various networks

April 3, 2013
H. Analyze the operations and features of transport layer protocols and services
I. Analyze the operations and features of network layer protocols and services and explain the fundamental concepts of routing
J. Design, calculate, and apply subnet masks and addresses to fulfill given requirements
K. Describe the operation of protocols at the OSI data link layer and explain how they support communications
L. Explain the role of physical layer protocols and services in supporting communications across data networks
M. Explain fundamental Ethernet concepts such as media, services, and operation
N. Employ basic cabling and network designs to connect devices in accordance with stated objectives
O. Build a simple Ethernet network using routers and switches
P. Use Cisco command-line interface (CLI) commands to perform basic router and switch configuration and verification
Q. Analyze the operations and features of common application layer protocols such as HTTP, Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), Simple Mail Transfer Protocol (SMTP), Telnet, and FTP.
R. Utilize common network utilities to verify small network operations and analyze data traffic

III. INSTRUCTIONAL MATERIALS

A. The instructional materials identified for this course are viewable through http://www.ctcd.edu/im/im_main.asp.

B. Required Equipment Supplied by Department:

Required Computer - A lap top or desk top computer meeting the specifications listed below:
Pentium IV or equal
2.0 GHZ
ATX architecture
80G hard drive (minimum)
Memory -128 MB minimum 256 MB recommend
400 MHz bus speed
CD Rom 52X or better
Sound Card with Speakers or Ear Phone
56K Modem
17” monitor non-interlaced .28 dot pitch or better
Keyboard & mouse

C. Routers and hand tools required to complete all lab exercises.
IV. COURSE REQUIREMENTS

This course has been designed with an on-line curriculum. The student will be required to attend classes and labs. Tests are taken on-line. It is mandatory that the student read the text material before coming to class. A complete journal will be due as requested. Late assignments may result in 25% less than full credit or a “0” if the assignment exceeds the Absolute Due Date.

V. EXAMINATIONS

A. There will be exams for each completed chapter and a final exam. All exams will be taken On-Line on the CISCO server and DURING CLASS TIME ONLY.

VI. SEMESTER GRADE COMPUTATION

The course grade will be calculated according to the following weights:

<table>
<thead>
<tr>
<th>Component</th>
<th>Possible Points</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Assignments (Lab Exercise, Learning Activities, and Packet Tracer Challenges)</td>
<td>300</td>
<td>1000 – 900 = A</td>
</tr>
<tr>
<td>Online Lesson Exams (Chapter Exams)</td>
<td>400</td>
<td>899 – 800 = B</td>
</tr>
<tr>
<td>Case Study</td>
<td>100</td>
<td>799 – 700 = C</td>
</tr>
<tr>
<td>Comprehensive Final Exam</td>
<td>200</td>
<td>699 – 600 = D</td>
</tr>
<tr>
<td>Comprehensive Skills-Based Exam (Pass/Fail)</td>
<td>0</td>
<td>599 -- 0 = F</td>
</tr>
<tr>
<td>Total</td>
<td>1000</td>
<td></td>
</tr>
</tbody>
</table>

VII. ATTENDANCE

Students are required to attend all classes in which they have enrolled. Students are required to be in the classrooms on time and remain for the duration of the class. Any time a student has 10 hours absence, an administrative withdrawal will be submitted.

A. Four Classes of 21/2 hours = 10 Hours
B. Late for Class = 1 Hour Absence: 10 Times = 10 Hours

VIII. NOTES AND ADDITIONAL INSTRUCTIONS FROM THE INSTRUCTOR

A. Course Withdrawal: It is the student’s responsibility to officially withdraw from a course if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file a Central Texas College Application of Withdrawal (CTC Form 59). The withdrawal form must be signed by the student.

CTC Form 59 will be accepted at any time prior to Friday of the 12th week of class during the 16-week fall and spring semesters. The deadline for sessions of the other lengths is:
10-week session  Friday of the 8th week
8-week session  Friday of the 6th week
5-week session  Friday of the 4th week

The equivalent date (75% of the semester) will be used for sessions of other lengths. The specific last day to withdraw is published each semester in the Student Bulletin.

A student who officially withdraws will be awarded the grade of “W” provided the student’s attendance and academic performance are satisfactory at the time of official withdrawal. Students must file a withdrawal application with the College before they may be considered for withdrawal.

A student may not withdraw from a class for which the instructor has previously issued the student a grade of “F” or “FN” for nonattendance.

B. Administrative Withdrawal: An administrative withdrawal may be initiated when the student fails to meet College attendance requirements. The instructor will assign the appropriate grade on CTC Form 59 for submission to the registrar.

C. Incomplete Grade: The College catalog states, an incomplete grade may be given in those cases where the student has completed the majority of the course work but, because of personal illness, death in the immediate family, or military orders, the student is unable to complete the requirements for a course. Prior approval from the instructor is required before the grade of “IP” for Incomplete is recorded. A student who merely fails to show for the final examination will receive a zero for the final and an “F” for the course.

D. Cellular Phones and Beepers: Cellular phones and beepers will be turned off while the student is in the classroom or laboratory.

E. Americans with Disabilities Act (ADA): Disability Support Services provides services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Explore the website at www.ctcd.edu/disability-support for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

F. Instructor Discretion: The instructor reserves the right of final decision in course requirements.

G. Civility: Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.
IX. COURSE OUTLINE

A. Unit One: Living in a Network-Centric World

1. Unit Objectives: Upon successful completion of this unit the student will be able to:
   a. Explain how networks impact our daily lives
   b. Describe the role of data networking in the human network
   c. Identify the key components of a data network
   d. Discuss the opportunities and challenges posed by converged networks
   e. Describe the characteristics of network architecture

2. Learning Activities:

   1. Read Unit One of course text, Living in a Network-Centric World
   2. Review the online lesson content at www.netacad.com
   3. Check your understanding by completing the Check Your Understanding questions at the end of the chapter
   4. Take the lesson practice quiz to test your knowledge at www.netacad.com
   5. Complete the lesson assignments

3. Assignment:

   1. Complete Learning Activity:
      o 1-1: Using Google earth to View the World
      o 1-2: Identifying Top Security Vulnerabilities
   2. Complete Lesson Lab Exercise:
      o 1-1: Using Collaboration Tools—IRC and IM
      o 1-2: Using Collaboration Tools—Wikis and Web Logs
   3. Complete Chapter Packet Tracer Challenge
   4. Complete the Lesson Exam contained in the online lesson content in www.netacad.com

   Learning Activities, Lab Exercises, and packet Tracer Challenges are located in the Network Fundamentals, CCNA Exploration Labs and Study Guide. You will submit these assignments to your instructor in class.

B. Unit Two: Communicating Over the Network

1. Unit Objectives: Upon successful completion of this unit the student will be able to:

   a. Describe the structure of a network, including devices and media necessary for communication
b. Explain what function protocols perform in network communications

c. Identify the advantages of using a layered model to describe network functionality

d. Discuss the role of each layer in the OSI network model and the TCP/IP network model

e. Discuss the importance of addressing and naming schemes in network communications

2. Learning Activities

1. Read Unit Two of course text, Communicating Over the Network
2. Review the online lesson content at: www.netacad.com
3. Check our understanding by completing the Check Your Understanding questions at the end of the chapter
4. Take the lesson practice quiz to test your knowledge at: www.netacad.com
5. Complete the lesson assignments

3. Assignment:

1. Complete Learning Activity:
   o 2-1: Using Neo Trace to View Internetworks
2. Complete Lesson Lab Exercise:
   o 2-1: Topology Orientation and Building a Small Network
   o 2-2: Using Wireshark to View Protocol Data Units
3. Complete Chapter Packet Tracer Challenge
4. Complete the Lesson Exam contained in the online lesson content in www.netacad.com

Learning Activities, Lab Exercises, and packet Tracer Challenges are located in the Network Fundamentals, CCNA Exploration Labs and Study Guide. You will submit these assignments to your instructor in class.

C. Unit Three: Application Layer Functionality and Protocols

1. Unit Objectives: Upon successful completion of this unit the student will be able to:

   a. Explain how the functions of the three upper OSI model layers provide network services to end-user applications

   b. Describe how the TCP/IP application layer protocols provide the services specified by the upper layers of the OSI model
c. Discuss how people use the application layer to communicate across the information network
d. Discuss the functions of well-known TCP/IP applications
e. Explain the file-sharing processes that use peer-to-peer applications and the Gnutella protocol
f. Describe how protocols ensure that services running on one kind of device can send and receive from many different network devices
g. Discuss how you can use analysis tools to examine and explain how common user applications work

2. Learning Activities

1. Read Unit Three of the course text. Application Layer Functionality and Protocols
2. Review the online lesson content at: www.netacad.com
3. Check your understanding by completing the Check Your Understanding questions at the end of the chapter
4. Take the lesson practice quiz to test your knowledge at: www.netacad.com
5. Complete the lesson assignments

3. Assignment:

1. Complete Learning Activity:
   o 3-1: Data Stream Capture
2. Complete Lesson Lab Exercise:
   o 3-1: Managing a Web Server
   o 3-2: E-mail Services and Protocols
3. Complete Chapter Packet Tracer Challenge
4. Complete the Lesson Exam contained in the online lesson content in www.netacad.com

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D. Unit Four: OSI Transport Layer

1. Unit Objectives: Upon successful completion of this unit the student will be able to:

   a. Explain why there is a need for the transport layer
   b. Describe the role of the transport layer
   c. Describe the role of two TCP/IP transport layer protocols: TCP and UDP
d. Describe the key functions of the transport layer protocol, including reliability, port addressing, and segmentation

e. Discuss how TCP and UDP handle key functions

f. Discuss when it is appropriate to use TCP or UDP, and what are some examples of applications that use each protocol

2. **Learning Activities**

   1. Read Unit Four of the course text, OSI Transport Layer
   2. Review the online lesson content at: [www.netacad.com](http://www.netacad.com)
   3. Check your understanding by completing the Check Your Understanding questions at the end of the chapter
   4. Take the lesson practice quiz to test your knowledge at: [www.netacad.com](http://www.netacad.com)
   5. Complete the lesson assignments

3. **Assignment:**

   1. Complete Lesson Lab Exercise:
      - 4-1: Observing TCP and UDP netstat
      - 4-2: TCP/IP Transport Layer Protocols, TCP and UDP
      - 4-3: Application and Transport Layer Protocols
   2. Complete Chapter Packet Tracer Challenge
   3. Complete the Lesson Exam contained in the online lesson content in [www.netacad.com](http://www.netacad.com)

   Learning Activities, Lab Exercises, and packet Tracer Challenges are located in the *Network Fundamentals, CCNA Exploration Labs and Study Guide*. You will submit these assignments to your instructor in class.

E. **Unit Five: OSI Network Layer**

   1. **Unit Objectives:** Upon successful completion of this unit the student will be able to:

      a. Identify what is the method described by the network layer for routing packet between devices on different networks
      b. Describe how the Internet Protocol (IP) works at the network layer to provide services to the upper layers of the OSI model
      c. Describe how devices are grouped into physical and logical networks
      d. Discuss how the hierarchical addresses of devices allow communications between networks
      e. Describe how routers use next-hop addresses to select a path for packets to reach their destination
2. **Learning Activities**

1. Read Unit Five of the course text, OSI Network Layer
2. Review the online lesson content at: [www.netacad.com](http://www.netacad.com)
3. Check your understanding by completing the Check Your Understanding questions at the end of the chapter
4. Take the lesson practice quiz to test your knowledge at: [www.netacad.com](http://www.netacad.com)
5. Complete the lesson assignments

3. **Assignment:**

1. Complete Lesson Lab Exercise:
   - 5-1: Examining a Device’s Gateway
   - 5-2: Examining a Route
2. Complete Chapter Packet Tracer Challenge
3. Complete the Lesson Exam contained in the online lesson content in [www.netacad.com](http://www.netacad.com)

**Learning Activities, Lab Exercises, and packet Tracer Challenges are located in the Network Fundamentals, CCNA Exploration Labs and Study Guide. You will submit these assignments to your instructor in class.**

F. **Unit Six: Addressing the Network – Ipv4**

1. **Unit Objectives:** Upon successful completion of this unit the student will be able to:
   a. Explain the type of addressing structure IPv4 uses
   b. Calculate the 8-bit binary equivalent of a given decimal number
   c. Calculate the decimal equivalent of a given 8-bit binary number
   d. Describe how IPv4 addresses are used in a network
   e. Discuss how administrators assign addresses within networks
   f. Describe how addresses are assigned by ISPs
   g. Identify the network portion of the host address
   h. Discuss the role of the subnet mask
   i. Explain the appropriate addressing components for IPv4, given addressing design criteria
   j. Demonstrate the use of testing utilities to verify and test network connectivity and operational status of the IP stack on a host
2. Learning Activities

1. Read Unit Six of the course text, Addressing the Network – Ipv4.(F1, F10)
2. Review the online lesson content at: www.netacad.com
3. Check your understanding by completing the Check Your Understanding questions at the end of the chapter
4. Take the lesson practice quiz to test your knowledge at: www.netacad.com
5. Complete the lesson assignments

3. Assignment:

1. Complete Lesson Lab Exercise:
   o 6-1: Ping and Traceroute
   o 6-2: Examining ICMP Packets
   o 6-3: IPv4 Address Subnetting Part 1
   o 6-4: IPv4 Address Subnetting Part 2
   o 6-5: Subnet and Router Configuration
2. Complete Chapter Packet Tracer Challenge
3. Complete the Lesson Exam contained in the online lesson content in www.netacad.com

Learning Activities, Lab Exercises, and packet Tracer Challenges are located in the Network Fundamentals, CCNA Exploration Labs and Study Guide. You will submit these assignments to your instructor in class.

G. Unit Seven: OSI Data Link Layer

1. Unit Objectives: Upon successful completion of this unit the student will be able to:
   a. Explain the role of the data link layer protocols in data transmission
   b. Describe how the data link layer prepares data for transmission on network media
   c. Explain how the types of MAC methods operate
   d. Identify the numerous common logical network topologies
   e. Describe how the logical topology determines the MAC method for a type of network
   f. Discuss the purpose of encapsulating packets in frames to facilitate media access
   g. Describe the Layer 2 frame structure
   h. Describe the Layer 2 frame fields
i. Explain the role of the key frame header and trailer fields, including addressing, QoS, type of protocol, and Frame Check Sequence

2. **Learning Activities**

1. Read Unit Seven of the course text, Data Link Layer
2. Review the online lesson content at: [www.netacad.com](http://www.netacad.com)
3. Check your understanding by completing the Check Your Understanding questions at the end of the chapter
4. Take the lesson practice quiz to test your knowledge at: [www.netacad.com](http://www.netacad.com)
5. Complete the lesson assignments.

3. **Assignment:**

1. Complete Lesson Lab Exercise:
   a. 7-1: Frame Examination
2. Complete Chapter Packet Tracer Challenge
3. Complete the Lesson Exam contained in the online lesson content in [www.netacad.com](http://www.netacad.com)

*Learning Activities, Lab Exercises, and packet Tracer Challenges are located in the Network Fundamentals, CCNA Exploration Labs and Study Guide. You will submit these assignments to your instructor in class.*

H. **Unit Eight: OSI Physical Layer**

1. **Unit Objectives:** Upon successful completion of this unit the student will be able to:

   a. Explain the role of physical layer protocols and services play in supporting communications across data networks
   b. Describe the purpose of physical layer signaling and encoding used in networks
   c. Identify the basic characteristics of copper, fiber, and wireless network media
   d. Discuss how signals represent bits as a frame as data is transported across the local media
   e. Describe the common implementations of copper, fiber, and wireless media in networks
2. Learning Activities

1. Read Unit Eight of the course text, OSI Physical Layer
2. Review the online lesson content at: www.netacad.com
3. Check your understanding by completing the Check Your Understanding questions at the end of the chapter
4. Take the lesson practice quiz to test your knowledge at: www.netacad.com
5. Complete the lesson assignments

3. Assignment:

1. Complete Lesson Lab Exercise:
   - 8-1: Media Connections
2. Complete Chapter Packet Tracer Challenge
3. Complete the Lesson Exam contained in the online lesson content in www.netacad.com

Learning Activities, Lab Exercises, and packet Tracer Challenges are located in the Network Fundamentals, CCNA Exploration Labs and Study Guide. You will submit these assignments to your instructor in class.

I. Unit Nine: Ethernet

1. Unit Objectives: Upon successful completion of this unit the student will be able to:
   a. Discuss how Ethernet evolved
   b. Describe purposes of the fields in the Ethernet frame
   c. Discuss the functions and characteristics of the media access control method used by Ethernet protocol
   d. Discuss the physical and data link layer features of Ethernet
   e. Describe how Ethernet hubs and switches are different
   f. Discuss the purpose of Address Resolution Protocol (ARP), and how it operates

2. Learning Activities

1. Read Unit Nine of the course text, Ethernet
2. Review the online lesson content at: www.netacad.com
3. Check your understanding by completing the Check Your Understanding questions at the end of the chapter
4. Take the lesson practice quiz to test your knowledge at www.netacad.com
5. Complete the lesson assignments
3. Assignment:

1. Complete Lesson Lab Exercise:
   o 9-1: Address Resolution Protocol (ARP)
   o 9-2: Cisco Switch MAC table Examination
   o 9-3: Intermediary Device as an End Device
2. Complete Chapter Packet Tracer Challenge
3. Complete the Lesson Exam contained in the online lesson content in
   [www.netacad.com](http://www.netacad.com)

Learning Activities, Lab Exercises, and packet Tracer Challenges are located in the
*Network Fundamentals, CCNA Exploration Labs and Study Guide*. You will submit
these assignments to your instructor in class.

J. Unit Ten: Planning and Cabling Networks

1. Unit Objectives: Upon successful completion of this unit, the student will
   be able to:
   a. Describe what basic network media is required to make a LAN
      connection
   b. Describe what types of connections are used for intermediate and
      end-device connectivity in a LAN
   c. Describe the pinout configurations for straight-through and
      crossover cables
   d. Describe the different cabling types, standards, and ports used in
      WAN connections
   e. Explain the role of device connections management when using
      Cisco equipment
   f. Design an addressing scheme for an internetwork assigning address
      ranges for hosts, network devices, and router interfaces
   g. Explain why network design is so important

2. Learning Activities

1. Read Unit Ten of the course text, Planning and Cabling Networks
2. Review the online lesson content at: [www.netacad.com](http://www.netacad.com)
3. Check your understanding by completing the Check Your
   Understanding questions at the end of the chapter
4. Take the lesson practice quiz to test your knowledge at:
   [www.netacad.com](http://www.netacad.com)
5. Complete the lesson assignments
3. **Assignment:**

1. Complete Lesson Lab Exercise:
   - 10-1: How Many Networks?
   - 10-2: Creating a Small Lab Topology
   - 10-3: Establishing a Console Session with Hyper Terminal
   - 10-4: Establishing a Console Session with Minicom

2. Complete Chapter Packet Tracer Challenge

3. Complete the Lesson Exam contained in the online lesson content in [www.netacad.com](http://www.netacad.com)

*Learning Activities, Lab Exercises, and packet Tracer Challenges are located in the Network Fundamentals, CCNA Exploration Labs and Study Guide. You will submit these assignments to your instructor in class.*

K. **Unit Eleven: Configuring and Testing Your Network**

1. **Unit Objectives:** Upon successful completion of this unit, the student will be able to:

   a. Explain the role of the IOS
   b. Describe the purpose of the configuration file
   c. Identify the classes of devices with the IOS embedded
   d. Discuss the factor contributing to the set of IOS commands available to a device
   e. Describe the IOS modes of operation
   f. List the basic IOS commands
   g. Discuss how the basic `show` commands are used and why

2. **Learning Activities**

   1. Read Unit Eleven of the course text, Configuring and Testing Your Network
   2. Review the online lesson content at: [www.netacad.com](http://www.netacad.com)
   3. Check your understanding by completing the Check Your Understanding questions at the end of the chapter
   4. Take the lesson practice quiz to test your knowledge at: [www.netacad.com](http://www.netacad.com)
   5. Complete the lesson assignments

3. **Assignment:**

   1. Complete Lesson Lab Exercise:
      - 11-1: Network Latency Documentation with Ping
      - 11-2: Basic Cisco Device Configuration
2. Complete Case Study – Lab Exercise: 11-7: Case Study: Datagram Analysis with Wireshark. This will be worth 100 points of your final grade.
3. Complete Chapter Packet Tracer Challenge
4. Complete the Lesson Exam contained in the online lesson content in www.netacad.com

Learning Activities, Lab Exercises, and packet Tracer Challenges are located in the Network Fundamentals, CCNA Exploration Labs and Study Guide. You will submit these assignments to your instructor in class.