CENTRAL TEXAS COLLEGE
SYLLABUS FOR ITCC 1404
Cisco Exploration 2- Routing Protocols and Concepts
CISCO II

SEMESTER HOURS CREDIT: 4

INSTRUCTOR: ____________________________
OFFICE HOURS: __________________________

I. INTRODUCTION

A. The primary focus of this course is on routing and routing protocols. The goal is to develop an understanding of how a router learns about remote networks and determines the best path to those networks. This course includes both static routing and dynamic routing protocols. By examining multiple routing protocols, you will gain a better understanding of each of the individual routing protocols and a better perspective of routing in general. Learning the configuration of routing protocols is fairly simple. Developing an understanding of the routing concepts themselves is more difficult, yet is critical for implementing, verifying, and troubleshooting routing operations.

B. Prerequisite ITCC 1401. Departmental approval is required.

II. LEARNING OUTCOMES

Upon successful completion of this course, (Routing Protocols and Concepts), the student will be able to:

A. Adhere to proper safety techniques. (OSHA standards). (F1)
B. Explain Routing and Packet Forwarding.(F1)
C. Explain how to verify route entries in the routing table as.(F1)
D. Compare and contrast the different routing protocols.(F1)
E. Implement Distance Vector Routing Protocols.(F1)
F. Describe the benefits of VLSM and CIDR. (F1, F10)
G. Describe link-state routing protocol concepts. (F1)
H. Describe the design requirements for LANs.(F1)
I. Demonstrate LAN-to-WAN routing. (F1, F10)
J. Configure internal and external sources. (F1, F10)
K. Demonstrate router troubleshooting techniques. (F1, F10)
L. Implement TCP/IP addressing using VLSM and CIDR. (F1, F10)
M. Configure IP addresses, including subnets. (F1, F10)
III. INSTRUCTIONAL MATERIALS

A. Required Text: The instructional materials identified for this course are viewable through www.ctcd.edu/books

B. Required Equipment Provided by Department:
   1. Required Computer - A laptop or desk top computer system
   2. Routers and tools required to complete all lab exercises.

C. Required Equipment Provided by Student:
   1. None

IV. COURSE REQUIREMENTS

This course has been designed as 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 and lab book will be due each time a chapter test is given and will be graded for that chapter. 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 an exam 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 classroom 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 2 1/2 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](http://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:** Introduction to Routing and Packet Forwarding

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

   a. Describe what features routers and computers have in common
   b. Describe the basic structure of a routing table
   c. Explain how to configure Cisco devices and apply addresses
   d. Explain in detail how a router determines the best path and then switches a packet

2. **Learning Activities:**

   a. Read unit one of course text, Introduction to Routing and Packet Forwarding (F1)
   b. Complete the exercises for unit one. (F1)
   c. Complete the on-line unit test. (F17)
   d. Complete all lab exercises and lab book worksheets listed in the on-line course material. (F1)

B. **Unit Two:** Static Routing

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

   a. Explain the role of a router in the network
b. Describe the relationship between router interfaces, directly connected networks, and the routing table
c. Explain how CDP can be used with directly connected networks
d. Describe how static routes can be used with directly connected networks
e. Describe the use and configuration of summary and default routes
f. Explain how packets get forwarded using static routes
g. Determine what commands you would use to manage and troubleshoot static routes

2. Learning Activities

a. Read Unit Two of course text, Static Routing (C3, C5, F1)
b. Complete the exercises for unit two. (C6, F2)
c. Complete the on-line test. (F17)
d. Complete all lab exercises and lab book worksheets listed in the on-line course material. (F1)

C. Unit Three: Introduction to Dynamic Routing Protocols

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

a. Describe the role of dynamic routing protocols and place these protocols in the context of modern network design
b. Describe how metrics are used by routing protocols and identify the metric types used by dynamic routing protocols
c. Explain several ways to classify routing protocols
d. Determine the administrative distance of a route and what its importance is to the routing process
e. Name the different elements in the routing table
f. Devise and apply subnetting schemes, given realistic constraints

2. Learning Activities

a. Read Unit Three of the course text, Introduction to Dynamic Routing Protocols (C3, C5, F1)
b. Complete the exercises for unit three. (C6, F2)
c. Complete the on-line exam for this unit. (F17)
d. Complete all lab exercises and lab book worksheets listed in the on-line course material. (F1)

D. Unit Four: Distance Vector Routing Protocols
1. **Unit Objectives:** Upon successful completion of this unit the student will be able to:

   a. Identify the characteristics of distance vector routing protocols
   b. Describe the network discovery process of distance vector routing protocols using Routing Information Protocol (RIP)
   c. Explain the processes for maintaining accurate routing tables that are used by distance vector routing protocols
   d. Identify the conditions leading to a routing loop and explain the implications for router performance
   e. Describe the types of distance vector routing protocols in use today

2. **Learning Activities**

   a. Read Unit Four of the course text, Distance Vector Routing Protocols (C3, C5, F1)
   b. Complete the exercises for unit four. (C6, F2)
   c. Complete the on-line exam for this unit. (F17)
   d. Complete all lab exercises and lab book worksheets listed in the on-line course material. (F1)

E. **Unit Five:** RIP Version 1

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

   a. Describe the functions, characteristics, and operations of the RIPv1 protocol
   b. Configure a device for RIPv1
   c. Verify proper RIPv1 operations
   d. Explain how RIPv1 performs automatic summarization
   e. Configure, verify, and troubleshoot default routes propagated in a routed network implanting RIPv1
   f. Describe the recommended techniques to solve problems related to RIPv1

2. **Learning Activities**

   a. Read Unit Five of the course text, RIP Version 1 (C3, C5, F1)
   b. Complete the exercises for unit five. (C6, F2)
   c. Complete the on-line exam for this unit. (F17)
   d. Complete all lab exercises and lab book worksheets listed in the on-line course material. (F1)

F. **Unit Six:** VLSM and CIDR
1. **Unit Objectives:** Upon successful completion of this unit the student will be able to:

   a. Compare and contrast classful and classless IP addressing
   b. Explain VLSM and identify the benefits of classless IP addressing
   c. Describe the role of the classless interdomain routing (CIDR) standard in making efficient use of scarce IPv4 addresses

2. **Learning Activities**

   a. Read Unit Six of the course text, VLSM and CIDR (C3, C5, F1)
   b. Complete the exercises for unit six. (C6, F2)
   c. Complete the on-line exam for this unit. (F17)
   d. Complete all lab exercises and lab book worksheets listed in the on-line course material. (F1)

G. Unit Seven: RIPv2

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

   a. Explain the limitations of RIPv1 as a classful routing protocol
   b. Describe the basic configuration commands used to apply Routing Information Protocol version 2 (RIPv2), and how to evaluate RIPv2 classless routing updates
   c. Analyze router output to see RIPv2 support for variable-length subnet masking (CLSM) and classless interdomain routing (CIDR)
   d. Identify which commands are used to verify RIPv2 and common issues
   e. Discuss commands used to configure, verify, and troubleshoot RIPv2

2. **Learning Activities**

   a. Read Unit Seven of the course text, RIPv2 (C3, C5, F1)
   b. Complete the exercises for unit seven. (C6, F2)
   c. Complete the on-line exam for this unit. (F17)
   d. Complete all lab exercises and lab book worksheets listed in the on-line course material. (F1)

H. Unit Eight: The Routing Table: A Closer Look

1. **Unit Objectives:** Upon successful completion of this unit the student will be able to:
a. Describe the various route types found in the routing table structure
b. Explain the route lookup process
c. Describe the typical routing behavior in a routed network

2. **Learning Activities**

a. Read Unit Eight of the course text, The Routing Table: A Closer Look (C3, C5, F1)
b. Complete the exercises for unit eight. (C6, F2)
c. Complete the on-line exam for this unit. (F17)
d. Complete all lab exercises and lab book worksheets listed in the on-line course material. (F1)

I. **Unit Nine: EIGRP**

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

a. Explain the background and history of EIGRP
b. Describe the features and operations of EIGRP
c. Identify what commands are used in configuring basic EIGRP and explain their purposes
d. Calculate the composite metric for EIGRP
e. Describe the concepts and operation of DUAL
f. Identify additional commands that can be used in the configuration of EIGRP and explain their uses

2. **Learning Activities**

a. Read Unit Nine of the course text, EIGRP (C3, C5, F1)
b. Complete the exercises for unit nine. (C6, F2)
c. Complete the on-line exam for this unit. (F17)
d. Complete all lab exercises and lab book worksheets listed in the on-line course material. (F1)

J. **Unit Ten: Link-State Routing Protocols**

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

a. Describe the basic features and concepts of link-state routing protocols
b. Explain the benefits and requirements of link-state routing protocols

2. **Learning Activities**
a. Read Unit 10 of the course text, Link-State Routing Protocols (C3, C5, F1)
b. Complete the exercises for unit ten. (C6, F2)
c. Complete the on-line exam for this unit. (F17)
d. Complete all lab exercises and lab book worksheets listed in the on-line course material. (F1)

K. Unit Eleven: OSPF

1. **Unit Objectives:** Upon successful completion of this unit the student will be able to:
   a. Describe the history and background of OSPF
   b. Explain the basic features of OSPF
   c. Describe, modify, and calculate the metric used by OSPF
   d. Explain the Designated Router and Backup Designated Router process in multi-access networks
   e. Describe how the default-information originate command is configured in OSPF to propagate a default route

2. **Learning Activities**
   a. Read Unit 11 of the course text, Access Control Lists (C3, C5, F1)
   b. Complete the exercises for unit 11. (C6, F2)
   c. Complete the on-line exam for this unit. (F17)
   d. Complete all lab exercises and lab book worksheets listed in the on-line course material. (F1)