

# SYLLABUS

(CIP 11.1002)

ITCC 1304 Cisco Exploration 2

Routing Protocols and Concepts

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## **COURSE DESCRIPTION: Routing Protocols and Concepts (2-2)**

**WECM Course Description:** This course describes the architecture, components, and operation of routers, and explains the principles of routing and routing protocols. Students analyze, configure, verify, and troubleshoot the primary routing protocols RIPv1, RIPv2, EIGRP, and OSPF. Recognize and correct common routing issues and problems. Model and analyze routing processes.

**TSTC Waco Expanded Course Description:** Describe the purpose, nature, and operations of a router; describe the purpose and nature of routing tables; describe the purpose and procedure of configuring static routes; design and implement a classless IP addressing scheme for a given network; describe the basic features and concepts of link-state routing protocols; and configure and verify basic RIPv1, RIPv2, single area OSPF, and EIGRP operations in a small routed network.

### **PRE-REQUISITES:**

- ITCC 1301

### **Location:**

- JBC Lab 329

### **Instructor:**

- Carol M. Meier  
JBC 236  
254-867-2994 – Direct Phone Number  
254-867-3231 – CNS Fax Number  
[cmeier@cns.tstc.edu](mailto:cmeier@cns.tstc.edu) – Instructor's Email Address  
Office Hours and teaching schedule posted at: <http://cns.tstc.edu/cmeier>

## RESOURCES:

| REQUIRED: TEXTBOOKS   | AUTHOR                          | PUBLISHER   | EDITION |
|---|---------------------------------|-------------|---------|
| <u><b>Routing Protocols &amp; Concepts: CCNA Exploration Companion Guide with CD-ROM,</b></u><br><b>ISBN: 10:1-58713-206-0</b><br><b>ISBN: 13:978-1-58713-206-3</b> | Rick Graziani,<br>Allan Johnson | Cisco Press | 2008    |
| <u><b>Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide</b></u><br><b>ISBN: 10:1-58713-204-4</b><br><b>ISBN: 13:978-1-58713-204-9</b>           | Allan Johnson                   | Cisco Press | 2008    |

| Materials & Tools                                  | Quantity |
|--|----------|
| 3" three ring binder (preferably "D" ring)         | 1        |
| Wire strippers                                     | 1        |
| Scissors or Snips                                  | 1        |
| RJ-11/45 Crimping Pliers                           | 1        |
| 50 feet of Cat 5, 5E Unshielded Twisted Pair Cable | 1        |
| RJ-45 Jacks  | 24       |

### Attendance & Professionalism

If you have accrued **absences totaling 15% of the class periods the instructor will assign you an "F" on the TSTC final grade roster. If you are more than 10 minutes late from the scheduled class start time, you will be counted absent.** This policy **DOES NOT** affect your right to drop a course before the mandated deadline or the right of the instructor to assign, with approval of the department chair, an IP under the appropriate extenuating circumstances. **Responsibility for dropping a course lies completely with you, the student!!!**

**You are expected to attend all scheduled classes. You are expected to be in class on time for each scheduled class.** If you are late, it is **your responsibility** to make sure you get counted present. **DO NOT interrupt my class to do so.** If you leave the class early, without previously making arrangements with the instructor, **YOU WILL be counted absent!!!**

**PROMPT ATTENDANCE IS ESSENTIAL FOR SUCCESSFUL COMPLETION OF THIS CLASS DUE TO THE INFORMATION SEQUENCE, CONTENT AND PRESENTATION FORMAT.**

## Mobile Devices

**Mobile devices (cell phones, smart phones, PDAs, etc) use by students while in class is prohibited!** Students must either have their mobile devices turned off or set on silent or vibrate while in class. **Students are not allowed to make calls or send text messages back and forth while in class.** If you receive a call while in class, take the call outside of the classroom, and then promptly return to the class. Students can also provide the CNS Front Desk number for emergency contacts. The CNS Front Desk number is **254-867-4831**.

## Conduct

All students are expected to conduct themselves as professionals in all actions and speech inside the classroom and at class-sponsored activities. The policies specified in the student handbook will be adhered to. Current policies can be found at <http://www.waco.tstc.edu/admissions/cs/> and then select "Student Code of Conduct" (pdf).

## For Students With Disabilities

If you have a documented disability that will impact your work in class, please contact the Office of Deaf and Disabled Services (D/DSS) so that appropriate arrangements for your accommodations can be made. In accordance with federal law, a student requiring accommodations must provide documentation of his/her disability to D/DSS. For information, visit D/DSS in the Fentress Center or call **254-867-3600**.

Once you and a D/DSS representative have signed a Letter of Special Accommodations, take the accommodations letter to each class for which an accommodation has been determined. Meet individually with each class instructor to discuss the accommodations letter. Have the instructor sign and keep a copy of the letter. Take the original, signed by the instructor, back to D/DSS so they are aware that the instructor has been officially informed of the need for accommodations.

**The instructor reserves the right to modify the Syllabus items, grading criteria and sequence of instruction as deemed appropriate at the time!!!!**

## Outcomes

### WECM Learning Outcomes:

- CO1: Describe the purpose, nature and operations of a router.
- CO2: Describe the purpose and nature of routing tables.
- CO3: Describe the purpose and procedure of configuring static routes.
- CO4: Design and implement a classless IP addressing scheme for a given network.
- CO5: Configure and verify basic RIPv1, RIPv2, EIGRP and Single-Area OSPF operations in a small routed network.
- CO 6: Describe the basic features and concepts of Link-State routing protocols.

### TSTC Waco Expanded Learning Outcomes:

- CO7: Describe router components.
- CO8: Configure and propagate static routes.
- CO9: Classify dynamic routing protocols.
- CO10: Describe the basic features and concepts of Distance-Vector routing protocols.
- CO11: Identify router metrics and administrative distances.
- CO12: Identify routing loops and describe preventative measures.
- CO13: Configure router auto-summarization.
- CO14: Describe network discovery.
- CO15: Design and implement a classless addressing scheme for a given network.
- CO16: Contrast Link-State routing protocols and Distance-Vector routing protocols.
- CO17: Define the requirements of Link-State routing protocols.
- CO18: Define the OSPF message encapsulation and message types.
- CO19: Define the OSPF DR/BDR election process.
- CO20: Modify OSPF intervals.
- CO21: Describe the basic features of RIPv1, RIPv2, EIGRP and Single-Area OSPF routing protocols.

**Licensing / Certification Agencies:** Cisco Systems, Inc. ([www.cisco.com](http://www.cisco.com))  
Computer Technologies Industry Alliance ([www.comptia.org](http://www.comptia.org))

This course is the second of four courses to prepare students to successfully complete the (vendor specific) Cisco Certified Network Associate (CCNA) exam and (vendor neutral) CompTIA's Network + exam. Students have two ways to achieve the CCNA certificate: you may take two exams – Interconnecting Network Devices (ICND) 1 (Exam 640-822) and ICND 2 (Exam 640-816) – or one exam: CCNA (Exam 640-802). These exams are ONLY for Cisco Networking Academy Students. CCNA Exams require scheduling and purchasing a voucher through Pearson VUE testing services ([www.pearsonvue.com](http://www.pearsonvue.com)) . The Net + Exam requires scheduling and purchasing a voucher through Pearson VUE or Prometric testing services. TSTC is a Prometric testing site and discounted vouchers are available through the CMT office.

## TSTC Grading Policy

TSTC measures student achievement of skills, knowledge and competencies through a system of grading standards. Four grades (A, B, C, D) indicate that credit was received and a grade was awarded. Making a grade of “D” in a core-technology course, however, will cause the student to have to repeat the course. One mark (CR) indicates that credit was received but no grade was awarded. One grade (F) and various other marks indicate that no credit was received and no grade was awarded.

The following system of final grades and marks is used by TSTC to report student performance for each course attempted and/or credited toward graduation.

**NOTE: Grades for all Major courses MUST be a “C” or better.**

| Grade | Percentage   | Description   | Grade Points |
|-------|--------------|---|--------------|
| A     | 90 and Above | Excellent/Superior Performance Level  | 4            |
| B     | 80 – 89      | Above Required Performance Level  | 3            |
| C     | 70 – 79      | Minimum Required Performance Level  | 2            |
| D     | 60 – 69      | Below Required Performance Level  | 1            |
| F     | Below 60     | Failure to Meet Performance Requirements  | 0            |
| IP    | --           | In Progress (for use when a student has not had sufficient time to complete the course due to the registration date, extended illness, or other circumstances beyond the student’s control)   | Not Computed |
| W     | --           | Withdrawal  | Not Computed |
| CR    | --           | Credit (represents credit for courses that are accepted toward program completion and graduation as a result of transfer from other institutions or programs, advanced standing evaluation, credit by examination, articulation agreements, or other validations or course-required knowledge and skills) | Not Computed |
| AUD   | --           | Audit of Course   | Not Computed |

### Knowledge-Based Assessments:

Knowledge-based assessments are on-line at <http://cisco.netacad.net>. All assessments must be activated by the instructor. Chapter assessments may be taken from any location with Internet access during the activation period and are open book, open notes. **The Final Exam MUST be proctored by the instructor and NO books, notes or Internet resources are allowed to be used during the exam.**

| Class Objective | Assessment  | Description   |
|-----------------|---|---|
| CO1, CO7        | ERouting Ch. 1: Introduction to Routing and Packet Forwarding | Describe the purpose, nature and operations of a router. Describe router components.                                |
| CO2, CO3        | ERouting Ch. 2: Static Routing                                | Describe the purpose and nature of routing tables. Describe the purpose and procedure of configuring static routes. |
| CO9, CO16       | ERouting Ch. 3: Introduction to Dynamic Routing Protocols     | Classify dynamic routing protocols. Contrast Link-State and Distance-Vector protocols                               |

|   |   |   |
|---|---|---|
| CO10  | ERouting Ch. 4: Distance-Vector Routing Protocols | Describe the basic features and concepts of Distance-Vector routing protocols.  |
| CO21, CO11, CO12, CO15  | ERouting Ch. 5: RIPv1                             | Describe the basic features of RIPv1 routing protocol. Identify router metrics and administrative distances. Identify routing loops and describe preventive measures. Design and implement a classful addressing scheme for a given network.          |
| CO4   | ERouting Ch. 6: VLSM and CIDR                     | Design a classless IP addressing scheme for a given network.  |
| CO21, CO11, CO12  | ERouting Ch. 7: RIPv2                             | Describe the basic features of RIPv2 routing protocol. Identify router metrics and administrative distances. Identify routing loops and describe preventative measures.   |
| CO2, CO11   | ERouting Ch. 8: The Routing Table                 | Describe the purpose and nature of routing tables. Identify router metrics and administrative distances.  |
| CO21, CO11, CO14  | ERouting Ch. 9: EIGRP                             | Describe the basic features of EIGRP routing protocol. Identify router metrics and administrative distances. Describe network discovery.  |
| CO5, CO16, CO17   | ERouting Ch. 10: Link-State Routing Protocols     | Describe the basic features and concepts of Link-State routing protocols. Contrast Link-State routing protocols and Distance-Vector routing protocols. Define the requirements of Link-State routing protocols.                                       |
| CO21, CO11, CO14, CO18, CO19  | ERouting Ch. 11: OSPF                             | Describe the basic features of Single-Area OSPF routing protocol. Identify router metrics and administrative distances. Describe network discovery. Define the OSPF message encapsulation and message types. Define the OSPF DR/BDR election process. |
| CO1, CO2, CO3, CO4, CO5, CO6, CO7, CO8, CO9, CO10, CO11, CO12, CO13, CO14, CO15, CO16, CO17, CO18, CO19, CO20 | ERouting Final Exam                               |   |

## Performance-Based Assessments:

| Class Objective     | Assessment   | Description  |
|---------------------|--|--|
| CO8                 | Lab 2-1: Basic Static Route Configuration                                    | Configure static routes  |
| CO15                | Lab 3-1: Subnetting Scenario 1, Design                                       | Design and implement a classful IP addressing scheme for a given network   |
| CO6, CO15           | Lab 3-1: Subnetting Scenario 1, Implementation on RIPv1                      | Configure and verify basic RIPv1 operations in a small routed network. Design and implement a classful addressing scheme for a given network                                 |
| CO6, CO15           | Lab 5-1: Basic RIP Configuration; Running RIPv1 on Classful networks         | Configure and verify basic RIPv1 operations in a small routed network. Design and implement a classful addressing scheme for a given network.                                |
| CO4                 | Activity 6-1: Basic VLSM Calculation and Addressing; Implementation on RIPv2 | Design and implement a classless IP addressing scheme for a given network.   |
| CO4, CO6, CO16      | Activity 6-1: Basic VLSM Calculation and Addressing; Design                  | Design and implement a classless IP addressing scheme for a given network. Configure and verify basic RIPv2 operations in a small routed network                             |
| CO6, CO8            | Lab 9-1: Basic EIGRP Configuration   | Configure and verify basic EIGRP operations in a small routed network. Configure and propagate static routes.  |
| CO16, CO17          | Lab 10: Implementing Link-State Routing Protocols                            | Contrast the Link-State routing protocols and Distance-Vector protocols. Define the requirements of Link-State routing protocols   |
| CO6, CO8, CO20      | Lab 11-1: Basic OSPF Configuration   | Configure and verify basic Single-Area OSPF operations in a small routed network. Configure and propagate static routes. Modify OSPF intervals.                              |
| CO4, CO6, CO8, CO20 | Hands-On Final   | Design and implement a classless IP addressing scheme for a given network. Configure and verify basic OSPF operations in a small routed network. Turn off auto summarization |

## Grading:

| Quantity | Activity                           | Function | % of Grade |
|----------|------------------------------------|----------|------------|
| 10       | Check Your Understanding Questions | Averaged | <b>10%</b> |
| 12       | Labs                               | Averaged | <b>20%</b> |
| 10       | ERouting Chapter Assessments       | Averaged | <b>20%</b> |
| 1        | ERouting On-Line Final Exam        | Total    | <b>20%</b> |
| 1        | ERouting Hands-On Final Exam       | Total    | <b>30%</b> |

## COURSE ASSESSMENTS:

All knowledge-based (chapter) assessments are taken on-line through the Cisco Network Academy site (<http://cisco.netacad.net>).

**Chapter assessments may be taken from any Internet-equipped computer and are open-book, open-note, open-Internet assessments.** Assessments are available from Wednesday/Thursday from 12:01 am until Sunday night at 11:59 pm. I will post a reminder announcement in MyLearning (Blackboard) every week and announce in class when the tests will be activated. The assessments are electronically graded and posted in the Cisco Networking Academy gradebook immediately after submission. Students will have access to see which test items they missed.

**The Final Exams (On-Line and Hands-On) MUST be taken in the presence of the instructor. End of course assessments are CLOSED BOOK, CLOSED NOTES, CLOSED INTERNET.**

**Failure to perform the On-Line or Hands-On Final Exam will result in failure of the course, regardless of previous course grade average. This is a Cisco requirement!!!!!!**

**Failure to PASS the Hands-On Final Exam with a minimum grade of 70 or above will result in failure of the course, regardless of previous course grade average!!!!!!**

## Course Schedule:

This course is a 15-week course. Schedules for individual sections may vary during the semester. Updated course schedules are maintained at: <http://cns.tstc.edu/cmeier>.

| Course Objective                       | Week | Activity   |
|--|------|--|
|  | 1    | Introduction to Course and Syllabus                      |
| CO1, CO7                               | 2    | Chapter 1: Introduction to Routing and Packet Forwarding |
| CO2, CO3, CO8                          | 3    | Chapter 2: Static Routing                                |
| CO9, CO15, CO16                        | 4    | Chapter 3: Introduction to Dynamic Routing Protocols     |
| CO6, CO10, CO15                        | 5    | Chapter 4: Distance-Vector Routing Protocols             |
| CO6, CO11,<br>CO12, CO15,<br>CO21      | 6    | Chapter 5: RIPv1   |
| CO4                                    | 7    | Chapter 6: VLSM and CIDR                                 |
| CO4                                    | 8    | Chapter 6: VLSM and CIDR                                 |
| CO4, CO6, CO11,<br>CO12, CO16,<br>CO21 | 9    | Chapter 7: RIPv2   |
| CO2, CO11                              | 10   | Chapter 9: EIGRP (skipping Chapter 8)                    |
| CO5, CO16, CO17                        | 11   | Chapter 10: Link-State Routing Protocols                 |
| CO6, CO8, CO11,<br>CO14, CO20          | 12   | Chapter 11: OSPF   |
|  | 13   | Review for On-Line and Hands-On Finals                   |
|  | 14   | Study/Practice for Finals<br>Take Finals                 |
|  | 15   | Finals   |

## ACKNOWLEDGEMENTS

**Syllabus developed by:** Carol M. Meier, faculty member of Texas State Technical College Waco.

**Authorizing Agency:** Texas Higher Education Coordinating Board, 1200 East Anderson Lane, Austin, TX 78752 ([www.theccb.state.tx.us](http://www.theccb.state.tx.us))

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