

SYLLABUS

(CIP 11.1002)

ITCC 1304 Cisco Exploration 2

Routing Protocols and Concepts

COURSE DESCRIPTION: Routing Protocols and Concepts (2-2-3)

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 329

Instructor:

Jim Hogue

JBC 232

254-867-3853 (voice)

254-867-3231 (phax)

jhogue@cns.tstc.edu

Office Hours posted at <http://cns.tstc.edu/jhogue>

RESOURCES:

REQUIRED: TEXTBOOKS	AUTHOR	PUBLISHER	EDITION
<u>Routing Protocols & Concepts: CCNA Exploration Companion Guide with CD-ROM,</u> ISBN: 10:1-58713-206-0 ISBN: 13:978-1-58713-206-3	Rick Graziani, Allan Johnson	Cisco Press	2008
<u>Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide</u> ISBN: 10:1-58713-204-4 ISBN: 13:978-1-58713-204-9	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 5 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.**

You are expected to sign in every class period.

You are expected to attend all scheduled classes. You are expected to be in class on time and sign a sign-in sheet (or alternate attendance method) for each scheduled class. If you are late, it is **your responsibility** to make sure that you sign the sign-in sheet (or alternate attendance method); otherwise, you will be counted absent. **Do not interrupt the 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 REQUIRED FOR SUCCESSFUL COMPLETION OF THIS CLASS DUE TO THE INFORMATION SEQUENCE, CONTENT, AND PRESENTATION FORMAT.

Mobile Devices: Mobile device (cell phones, text phones, etc) use by students while in class is prohibited! Only instructors are allowed to use mobile devices in class. Students must turn them off or set them to silent. Students are not allowed to answer calls, make calls, or send text messages during class. Students using phones during class will be asked to leave and given a zero for all work scheduled for that day (including tests). For emergency situations, students are contacted through the CNS Reception Desk at **254-867-4831**. Please let whoever is calling know which class you are in and the name of your instructor. Personnel manning the reception desk will contact the instructor of your class so we can let you know about the emergency and develop a plan of action.

Conduct: You will conduct yourself as a professional in all actions and speech inside the classroom and at class-sponsored activities. The policies specified in the student handbook will be adhered to. Violators will be dealt with in accordance with the above policies. Current policies can be found at <http://www.waco.tstc.edu/admissions/cs/> and then selecting "Student Code of Conduct (pdf)".

For Students with Disabilities:

If you have a documented disability that will impact your work in the 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 requesting 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: Describe the basic features and concepts of link-state routing protocols
- CO6: Configure and verify basic RIPv1, RIPv2, single area OSPF, and EIGRP operations in a small routed network.

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 auto summarization
- CO14: Describe network discovery
- CO15: Design and implement a classful addressing scheme for a given network
- CO16: Contrast link-state routing protocols and distance-vector 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, single-area OSPF, and EIGRP routing protocols.

Licensing / Certification Agencies: Cisco Systems, Inc. (www.cisco.com)
Computer Technologies Industry Alliance (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 Plus (Net +) 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 academy students. CCNA exams require scheduling and purchasing a voucher through Pearson VUE testing services (www.pearsonvue.com). The Network+ Exam requires scheduling and purchasing a voucher through Pearson VUE or Prometric testing services. TSTC is a Prometric testing site and discounted vouchers can be purchased 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. 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 C or better

Grade	Percentage	Interpretation	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 of course-required knowledge and skills)	Not Computed
AUD	--	Audit of Course	Not Computed
See college catalog for complete descriptions.			

Instructor's Assignment Policy

Assignments are due at the end of the class specified, but will be accepted, with penalty, up to the midterm for weeks one through six and up to the scheduled final exam for weeks seven through eleven. Penalty will be 10 points for each week or part thereof the assignment is past due.

Knowledge-Based Assessments:

Knowledge-based assessments are on-line at 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 taken in the presence of the instructor and no helps, books, or notes are allowed to be accessed during the exam.

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

CO10	ERouting Chapter 4: Distance Vector Routing Protocols	Describe the basic features and concepts of distance-vector routing protocols.
CO21, CO11, CO12, CO15	ERouting Chapter 5: RIP Version 1	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 Chapter 6: VLSM and CIDR	Design a classless IP addressing scheme for a given network
CO21, CO11, CO12,	ERouting Chapter 7: RIP Version 2	Describe the basic features of RIPv2 routing protocol. Identify router metrics and administrative distances. Identify routing loops and describe preventative measures.
CO2, CO11	ERouting Chapter 8: The Routing Table: A Closer Look	Describe the purpose and nature of routing tables. Identify router metrics and administrative distances.
CO21, CO11, CO14	ERouting Chapter 9: EIGRP	Describe the basic features of EIGRP routing protocol. Identify router metrics and administrative distances. Describe network discovery.
CO5, CO16, CO17	ERouting Chapter 10: Link-State Routing Protocols	Describe the basis features and concepts of link-state routing protocols. Contrast link-state routing protocols and distance-vector protocols. Define the requirements of link-state routing protocols.
CO21, CO11, CO14, CO18, CO19	ERouting Chapter 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.
CO 1, 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; Design	Design and implement a classless IP addressing scheme for a given network
CO4, CO6, CO16	Activity 6-1: Basic VLSM Calculation and Addressing; Implementation on RIPv2	Design and implement a classless IP addressing scheme for a given network. Configure and verify basic RIPv2 operations in a small routed network.
CO2	Lab 8-1: Investigating the Routing Table Lookup Process	Describe the purpose and nature of routing tables
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.
CO 4, CO6, CO8, CO13,	Hands-on Final Exam	Design and implement a classless IP addressing scheme for a given network. Configure and verify basic EIGRP operations in a small routed network. Configure and propagate static routes. Configure auto summarization.

Grading:

Quantity	Activity	Function	% of Grade
11	Check Your Understanding Questions	Averaged	10%
13	Labs	Averaged	20%
11	ERouting Chapter Assessments	Averaged	20%
1	ERouting Final Exam	Total	20%
1	Hands-on Final Exam	Total	30%
	Total		100%

COURSE ASSESSMENTS:

Knowledge-based 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 assessments. Assessments will only be available for a limited time so it is imperative that you study and schedule your time so that you can take the appropriate assessment while it is available. Assessments will normally be available from the morning of the last class period of the week through the following Sunday night (12:01 am Thursday/Friday through 11:59 pm Sunday). Assessments are timed and cannot be extended beyond 2 hours. Assessments are electronically graded and posted in the Cisco Network Academy gradebook immediately after submission.

The end of course assessments must be taken in the presence of the instructor. It is your responsibility to schedule the assessments and meet those appointments ready to take the assessments. End of course assessments are closed book, closed notes, and are timed for a maximum of two hours. Failure to meet the assessment appointments (except with notice and for good cause), or failure to schedule assessment appointments prior to the 13th week of class will result in class failure.

Failure to perform the written 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: (Sequence of instruction recommended based on learning outcomes)

This course is a 15-week course. Schedules for individual sections may vary during the semester. Updated schedules will be maintained at <http://cns.tstc.edu/jhogue>. Follow the links to find the appropriate schedule.

Course Objective	Week	Activity
	1	Introduction to Course & Syllabus, Network Fundamentals Review
CO1, CO7	2	Chapter 1: Introduction to Routing and Packet Forwarding. Check Your Understanding Questions, <u>Companion Guide</u> , pp 59 – 62 Lab 1-1: Cabling a Network and Basic Router Configuration, <u>Labs and Study Guide</u> , pp 27 through Task 9, Step 5 on page 41 Lab 1-2: Basic Router Configuration, <u>Labs and Study Guide</u> , pp 52 through 61 Assessment: cisco.netacad.net, ERouting Chapter 1.
CO2, CO3, CO 8	3	Chapter 2: Static Routing Check Your Understanding Questions, <u>Companion Guide</u> , pp 137 – 142. Lab 2-1: Basic Static Route Configuration, <u>Labs and Study Guide</u> , pp 98 through 117 Assessment: cisco.netacad.net, ERouting Chapter 2.
CO9, CO 15, CO16	4	Chapter 3: Introduction to Dynamic Routing Protocols Check Your Understanding Questions, <u>Companion Guide</u> , pp 175 – 178. Lab 3-1: Basic Static Route Configuration, <u>Labs and Study Guide</u> , pp 148 through 152. Assessment: cisco.netacad.net, ERouting Chapter 3.
CO 6, CO10, CO 15	5	Chapter 4: Distance Vector Routing Protocols Check Your Understanding Questions, <u>Companion Guide</u> , pp 215 – 217. Lab: Configure routers using RIPv1 and the addressing scheme from <u>Labs and Study Guide</u> , Table 3-5, p 149 Assessment: cisco.netacad.net, ERouting Chapter 4.
CO 6, CO11, CO12, CO15, CO21	6	Chapter 5: RIP version 1 Check Your Understanding Questions, <u>Companion Guide</u> , pp 257 – 260. Lab 5-1, Scenario A: Running RIPv1 on Classful Networks, <u>Labs and Study Guide</u> , pp 203 through 208 Assessment: cisco.netacad.net, ERouting Chapter 5.
CO4	7	Chapter 6: VLSM and CIDR Check Your Understanding Questions, <u>Companion Guide</u> , pp 258 – 263. Activity 6-1: Basic VLSM Calculation and Addressing Design, <u>Labs and Study Guide</u> , pp 258 through 263 Assessment: cisco.netacad.net, ERouting Chapter 6.
CO4, CO6, CO11, CO12, CO 16, CO21	8	Chapter 7: RIP version 2 Check Your Understanding Questions, <u>Companion Guide</u> , pp 331 – 332. Lab: Configure routers using RIPv2 and the Addressing Scheme from <u>Labs and Study Guide</u> , Table 6-9, p 263 Assessment: cisco.netacad.net, ERouting Chapter 7.

CO2, CO11	9	Chapter 8: The Routing Table: A Closer Look Check Your Understanding Questions, <u>Companion Guide</u> , pp 383 – 387. Lab 8-1: Investigating the Routing Table Lookup Process, <u>Labs and Study Guide</u> , pp 364 through 368 Assessment: cisco.netacad.net, ERouting Chapter 8.
CO6, CO8, CO11, CO21	10	Chapter 9: EIGRP Check Your Understanding Questions, <u>Companion Guide</u> , pp 464 – 467. Lab 9-1: Basic EIGRP Configuration, <u>Labs and Study Guide</u> , pp 411 through 427 Assessment: cisco.netacad.net, ERouting Chapter 9.
CO5, CO16, CO17	11	Chapter 10: Link-State Routing Protocols Check Your Understanding Questions, <u>Companion Guide</u> , pp 494 – 497. Lab 10: Implementing Link-State Routing Protocols, <u>Labs and Study Guide</u> , pp 469 through 470. Assessment: cisco.netacad.net, ERouting Chapter 10.
CO 6, CO8, CO11, CO14, CO20	12	Chapter 11: OSPF Check Your Understanding Questions, <u>Companion Guide</u> , pp 556 – 558. Lab 11-1, Scenario A: Basic OSPF Configuration, <u>Labs and Study Guide</u> , pp 495 through 509 Assessment: cisco.netacad.net, ERouting Chapter 11.
	13	Review for Finals, Schedule Finals
	14	Study / Practice for Finals
	15	Finals

64 Total Hours

ACKNOWLEDGEMENTS

Syllabus developed by: Jim Hogue, faculty member of Texas State Technical College Waco.

Authorizing Agency:

Texas Higher Education Coordinating Board, 1200 East Anderson Lane, Austin, TX 78752
(www.thecb.state.tx.us)

Project Staff:

Tom Dean, CNS Department, Texas State Technical College Waco (tdean@cns.tstc.edu)
Carol Meier, CNS Department, Texas State Technical College Waco (cmeier@cns.tstc.edu)
Geof Schwer, CNS Department, Texas State Technical College Waco (gschwer@cns.tstc.edu)
Derek Smith, NST Department, Texas State Technical College Waco (dsmith@cns.tstc.edu)
Jim Hogue, CNS Department, Texas State Technical College Waco (jhogue@cns.tstc.edu)

Project Partners:

Cisco Systems Inc. (www.cisco.com)
Educational Service Center Region 11, Fort Worth, TX, (www.esc11.net)

Permission to use or reproduce this document in whole or part is granted for not-for-profit educational and research purposes only. For any other use, please request permission in writing from the Vice President for Student Learning, Texas State Technical College Waco, 3801 Campus Drive, Waco, TX 76705. Phone: (254) 867- 4834. FAX: (254) 867-3968.
