

ITNW 2353

Advanced Routing and Switching

Spring 2017

Instructor: Michael Slaughter
Email: mslaughter@southplainscollege.edu
Office Number: (806) 716-2242
Course Name: ITNW 2353.001
Course Days: Wednesday (Hybrid)
Course Time: 08:30 – 12:20 PM

Course Description

Advanced concepts for the implementation, operation, and troubleshooting of switched and routed environments. Emphasizes advanced routing protocols, Multi Protocol Label Switching (MPLS), and advanced security. In this class we will explore Implementing advanced routing protocols; configuring route filtering and redistribution, advanced security, and scalable multilayer-switched LANs; implementing appropriate technologies to build a scalable routed network; implementing campus networks using multiplayer switching technologies; and analyzing traffic flow, reliability, redundancy, and performance for campus LANs, routed and switched WANs, and remote access networks.

Hybrid

This is a hybrid format class. This means we will meet for class once a week, and the remaining part of the course will be online. You must check Blackboard regularly for updates, otherwise you may miss an important announcement. Our in class meeting will be a mix between in class labs and lectures.

Textbook and Hardware Requirements

We will be using TestOut LabSim and a supplemental text by Pearson for this course. You will need to purchase an activation code from the SPC bookstore. Once activated, you will need to enroll in the course mentioned below. Also below is a link to a video with instructions on how to enroll in the LabSim course. This software will provide you with a virtual environment that we will use for labs, homework assignments and exams. It will also provide you with a wealth of information, reading materials, and videos to aid in your learning experience. This particular LabSim course will also prepare you for the TestOut Network Pro Certification and the CompTIA Network + certification.

LabSim:

Promo Code: 14-232TA
Course Product: TestOut Network Pro 4.0 ISBN: 978-1-935080-43-5
School Name: South Plains College
Instructor Name: Michael Slaughter
Course Name: SP2017-ITNW 2353.001
Purchase Link: <http://www.testout.com/home/student-resources/student-purchasing>
Instructions Link: <http://www.testout.com/home/student-resources/how-to-tutorials>

(View the "[Getting Started - Student Accounts Not Activated by Teachers](#)" PDF)

Pearson Book (Required):

CCNA Routing and Switching ICND2 200-105 Official Cert Guide, Academic Edition 1st Edition

ISBN: 978-1587205989

Software Requirements

Because some of the assignments will be done and submitted outside of class, you will need access to the following programs outside of the classroom:

- Google Chrome Web Browser
- TestOut Account

Assumed Knowledge

It is assumed that you possess basic computer skills relating to using the internet, applications and other basic computing tasks. It is also assumed that if you run into content you do not understand; you will **research** that content on your own as well as **ask** the instructor for assistance.

Communication

Communication for this class will be conducted through SPC email. All students will be required to check their SPC student email accounts regularly for course updates and announcements. Please include your name, course name, and section number in all email communication. Other important announcements may be given during in class meetings, so attendance is key for complete communication.

Attendance Policy

You will be **dropped** from the course with an "X" or an "F" after **four** absences, or if I feel the objectives cannot be met due to excessive absence. If you are not sure how many absences you have accumulated, please be sure to notify me so that I can provide you with an absentee count.

If you are absent, you are still required to complete the assigned work by the indicated due date. You'll want to be sure to ask a classmate what material you missed on the day you were absent so that you'll be caught up when you return. I will not repeat the information you missed when you return. Frequent tardiness will result in an absence.

Reading/Study Assignments

Mandatory, assigned reading is a requirement for this course. Reading assignments includes all material in the LabSim course content that is assigned for a given week. Study assignments include all lectures in LabSim, demonstrations in LabSim, notes taken from your in-class lectures, and other content presented throughout the course. Although reading/study assignments are not taken for a grade, they are required to be successful in this course.

Assignments and Lab Projects

Procrastination will not serve you well in this course. Most assignments will be available through the LabSim software. Each chapter will have several small assignments and labs that

will count toward your homework grade. For the TestOut LabSim section assigned, all labs and exams are pulled for homework grades.

There will also small homework assignments and projects that will be assigned periodically throughout the semester. These assignments and/or projects will be announced in class and available in Blackboard. **NO LATE WORK IS ACCEPTED!** In-class labs will also be completed throughout this course. It is expected that you take care of all equipment and check that equipment in/out with the instructor.

Exams

There will be two exams given in this class, a midterm and a final exam. **Make-up exams will not be given.** If the midterm exam is missed, then the final exam grade will count as both the final and midterm grade. Also, if a student does better on the final than the midterm, I will substitute the final grade as the midterm grade.

Grades

Grades will be calculated as follows:

	Possible Points
Assignments/Lab Projects	30%
Midterm	30%
Final Exam	40%

All assignments are mandatory. **I reserve the right to drop or fail you if homework assignments are frequently missed or incomplete.**

Grades will be available through LabSim (Homework/Exam Grades) and Blackboard. Blackboard grades will show a running average of how you are performing throughout the semester. Blackboard grades will be updated regularly throughout the semester.

Instructional and Outside Course Time Estimation:

In-Class Instructional/Lab/Quiz Time: 3.3hrs/wk x 16wks = 52.8 hrs

TestOut LabSim Time: 3hrs/wk x 16wks = 48 hrs

Midterm Exam Prep: 4 hrs/wk x 2 wks = 8hrs

Final Exam Prep: 4hrs/wk x 3wks = 12 hrs

TestOut Cert Exams: 4hrs x 1 = 4 hrs

Exam Time: 2hrs/exam x 2 = 4 hrs

Total Course Time = 128.8 hrs

Total Time/Week = 8.05 hrs

In-Class Computer, Cell Phone and iPod Use

Students will **not** be allowed to surf the web, check their personal e-mail or social media accounts, or do work for any other course while class is in session.

Students will not be allowed to use their cell phones during class. If the student is found using social media, surfing the web, or using their cell phone, they will be asked to leave the class and they will be counted absent for that day. If the incident reoccurs, they will be reported to the dean of students. In cases of emergency, the student is asked to leave the classroom to use their cell phone. **If a student has a cell phone or other device out during an exam, they will be asked to leave and will get a zero for that exam.**

Food and Drinks

No food or drinks are allowed in the Technology Center. Do not bring those to class. If you do, you will be asked to leave class and counted as absent. If this happens more than once you may be dropped from the class.

Drop Policy

You may be dropped from this course for the following reasons:

- Attendance
 - You have four or more absences
- Participation, completion of homework, exams, and team project
 - You have missed 2-3 classes and several homework assignments
 - You have missed several homework assignments
 - You have missed two or more exams without rescheduling with the instructor
- Academic Integrity
 - Cheating, plagiarism, or sharing your work with others

NOTICE

Texas SB11 (Campus Concealed Carry) does not go into effect for community colleges until August 1st, 2017.

Academic Integrity

It is the aim of the faculty at South Plains College to foster a spirit of complete honesty and a high standard of integrity. The attempt of any student to present as his or her own any work which he or she has not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offender liable to serious consequences and possible suspension. Please refer to the SPC General Catalog regarding consequences for cheating and plagiarism. **I reserve the right to administratively drop with an “F” any student whom I suspect of academic dishonesty.**

****Do not, under any circumstances, turn in another student’s file as your own. Do not, under any circumstances, give your file to anyone else to turn in as their own. Both situations are representative of academic dishonesty and will be treated as such.****

Disclaimer

Because we will use Blackboard to conduct a portion of this class, please note that the materials you may be accessing in chat rooms, bulletin boards or unofficial web pages are not officially sponsored by South Plains College. The United States Constitution rights of free speech apply to all members of our community regardless of the medium used. We disclaim all liability for data, information or opinions expressed in these forums.

Diversity Statement

In this course, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world, and about ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should be and can be.

Special Services

4.1.1.2 Disabilities Statement

Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Disability Services Office. For more information, call or visit the Disability Services Office through the Guidance and Counseling Centers at Reese Center (Building 8) 716-4606, or Levelland (Student Services Building) 716-2577.

Counseling

If at any point in the semester you find yourself having trouble with stress or feel depressed please stop in and see a counselor. Counseling services are available at all campuses. The number for the counseling office is 806-716-2366. Below is a link to SPC's personal counseling services.

<http://www.southplainscollege.edu/information-for/current-spc-students/counseling-current/personal-counseling.php>

Course Schedule

Week	Date	Chapter
1	Jan 17 - 22	6.0 LAN Switching
2	Jan 23 - 29	7.0 IP Routing Technologies
3	Jan 30 – Feb 5	8.0 IP Services
4	Feb 6 - 12	9.0 Device Configuration Management 10.0 ICND2 Introduction 11.1 – 11.3 Advanced Switching
5	Feb 13 - 19	11.4 – 11.5 Advanced Switching
6	Feb 20 – 26	12.1 – 12.3 Advanced Routing Midterm Review
7	Feb 27 – Mar 5	12.4 – 12.5 Advanced Routing Midterm Review
8	Mar 6 - 12	Midterm Exam
March 13 – 19 SPRING BREAK		
9	Mar 20 - 27	13.1 – 13.3 WANs
10	Mar 27 – Apr 2	13.3 – 13.6 WANs
11	Apr 3 - 9	14.1 – 14.4 IPv4 Routing Protocols
12	Apr 10 - 16	14.5 – 14.8 IPv4 Routing Protocols
13	Apr 17 - 23	15.0 IPv6 Routing Protocols
14	Apr 24 - 30	16.0 Network Management Using Cisco Devices
15	May 1 - 7	TestOut Routing and Switching Pro Practice Exams
16	May 8 - 11	Final Exam

- **These dates are subject to change. All HOMEWORK IS DUE on Sunday night at 11:59 PM.**

Appendix B: Approximate Time for the Course

The total time for the LabSim for Routing and Switching Pro course is approximately **53 hours and 56 minutes**. Time is calculated by adding the approximate time for each section which is calculated using the following elements:

- Video/demo times
- Text Lessons (5 minutes assigned per text lesson)
- Simulations (5 minutes assigned per simulation)
- Questions (1 minute per question)

Additionally, there are approximately another **43 hours and 35 minutes** of Practice Test material at the end of the course.

The breakdown for this course is as follows:

Module	Sections	Time	Videos	Labs	Text	Exams
1.0: ICND1 Introduction						
	1.1: ICND1 Introduction	11	1	0	10	0
	Total	0:11	0:01	0:00	0:10	0:00
2.0: Networking Concepts						
	2.1: Networking Fundamentals	26	12	0	10	4
	2.2: Network Devices	60	31	0	15	14
	2.3: TCP/IP Networking Model	53	35	0	15	3
	2.4: Data Encapsulation	18	9	0	5	4
	2.5: OSI Networking Model	50	15	0	25	10
	2.6: Data Communications	34	20	0	5	9
	2.7: Ethernet Networking	59	27	0	20	12
	Total	5:00	2:29	0:00	1:35	0:56
3.0: IPv4 Addressing						

3.1: IPv4 Overview	41	27	0	10	4
3.2: IPv4 Address Classes	38	16	0	15	7
3.3: Subnetting	35	22	0	10	3
3.4: Variable Length Subnet Masking (VLSM)	36	18	0	10	8
3.5: Subnet Planning and Design	40	17	10	5	8
Total	3:10	1:40	0:10	0:50	0:30
4.0: IPv6 Addressing					
4.1: IPv6 Addressing Overview	42	17	0	15	10
4.2: IPv6 Host Configuration	31	7	0	15	9
Total	1:13	0:24	0:00	0:30	0:19
5.0: Cisco Device Basics					
5.1: Cisco Device Access	17	5	0	5	7
5.2: System Startup	19	4	0	10	5
5.3: Command Line Interface (CLI)	43	11	5	20	7
5.4: Command Line Help	31	7	0	15	9
5.5: Basic Device Settings	48	11	15	15	7
5.6: Device Passwords	50	12	15	10	13
5.7: System Message Log	23	10	0	5	8
5.8: Network Communications Troubleshooting	58	17	5	25	11
Total	4:49	1:17	0:40	1:45	1:07
6.0: LAN Switching					
6.1: Layer 2 Switching Overview	63	30	0	20	13
6.2: Switch Interface Configuration	31	11	5	10	5
6.3: Switch IP Configuration	65	10	20	20	15
6.4: Virtual LANs (VLANs)	34	12	5	10	7

6.5: Trunking	55	16	10	15	14
6.6: Switch Security	54	9	15	15	15
6.7: Remote Switch Access	13	4	0	5	4
6.8: Cisco Discovery Protocol (CDP)	43	7	20	10	6
6.9: Switch Troubleshooting	45	9	15	10	11
Total	6:43	1:48	1:30	1:55	1:30
7.0: IP Routing Technologies					
7.1: IPv4 Routing	34	9	0	10	15
7.2: IPv4 Routing Troubleshooting	77	69	0	5	3
7.3: Routing Implementations	46	19	0	15	12
7.4: Static Routing	26	8	5	5	8
7.5: Route Summarization	35	14	5	10	6
7.6: IPv6 Routing	43	34	0	5	4
7.7: InterVLAN Routing Overview	25	17	0	5	3
7.8: InterVLAN Routing Configuration	38	14	5	10	9
Total	5:24	3:04	0:15	1:05	1:00
8.0: IP Services					
8.1: Dynamic Host Configuration Protocol (DHCP)	63	18	15	15	15
8.2: Access Control Lists (ACLs)	32	18	0	10	4
8.3: ACL Configuration	53	19	15	10	9
8.4: ACL Troubleshooting	21	7	0	5	9
8.5: Network Address Translation (NAT) Overview	19	5	0	5	9
8.6: NAT Configuration	52	24	15	5	8
8.7: Network Time Protocol (NTP)	16	4	0	5	7
Total	4:16	1:35	0:45	0:55	1:01

9.0: Device Configuration and Management

9.1: Router Configuration Files	53	41	0	5	7
9.2: IOS Licensing	32	19	0	5	8
9.3: NetFlow	29	13	0	5	11
Total	1:54	1:13	0:00	0:15	0:26

10.0: ICND2 Introduction

10.1: ICND2 Introduction	2	2	0	0	0
Total	0:02	0:02	0:00	0:00	0:00

11.0: Advanced Switching

11.1: Advanced Trunking	25	4	5	10	6
11.2: Spanning Tree Overview	27	6	0	10	11
11.3: Spanning Tree Concepts	94	64	10	10	10
11.4: Spanning Tree Protocol Configuration	72	29	25	10	8
11.5: Switch Troubleshooting	29	21	0	5	3
Total	4:07	2:04	0:40	0:45	0:38

12.0: Advanced Routing

12.1: Dynamic Routing	63	23	5	20	15
12.2: Layer 3 InterVLAN Routing	54	12	20	10	12
12.3: Default Gateway Redundancy	51	21	5	10	15
12.4: IPv6 and Extended IPv4 ACLs	29	14	0	10	5
12.5: IPv6 and Extended ACL Configuration	66	18	20	15	13
Total	4:23	1:28	0:50	1:05	1:00

13.0: Wide Area Networks

13.1: WAN Types	36	11	0	10	15
13.2: Leased Line WAN Links	42	18	10	10	4

13.3: PPP and Multilink PPP	59	25	5	15	14
13.4: PPPoE Configuration	23	5	10	5	3
13.5: Virtual Private Networks	52	28	0	15	9
13.6: WAN Troubleshooting	49	14	25	5	5
Total	4:21	1:41	0:50	1:00	0:50
14.0: IPv4 Routing Protocols					
14.1: Open Shortest Path First (OSPF) Overview	35	21	0	5	9
14.2: OSPF for IPv4	34	24	0	5	5
14.3: OSPF Configuration	48	17	15	5	11
14.4: OSPF Areas and LSA Types	39	30	0	5	4
14.5: EIGRP for IPv4 Routing	31	22	0	5	4
14.6: EIGRP for IPv4 Configuration	51	35	5	5	6
14.7: eBGP for IPv4	31	20	0	5	6
14.8: IPv4 Routing Protocol Troubleshooting	56	14	20	10	12
Total	5:25	3:03	0:40	0:45	0:57
15.0: IPv6 Routing Protocols					
15.1: IPv6 Routing	25	11	0	10	4
15.2: OSPF for IPv6	24	15	0	5	4
15.3: EIGRP for IPv6	25	16	0	5	4
Total	1:14	0:42	0:00	0:20	0:12
16.0: Network Management Using Cisco Devices					
16.1: Simple Network Management Protocol	43	29	0	5	9
16.2: Quality of Service (QoS)	27	17	0	5	5
16.3: Enterprise Networking	24	12	0	5	7
16.4: Cloud Resources	33	17	0	10	6

16.5: Network Security	21	6	0	10	5
Total	2:28	1:21	0:00	0:35	0:32
Total Course Time 53:56					
Practice Exams					
A.0: TestOut Switching Pro Practice Exams	Number of Questions		Time		
A.2: TestOut Switching Pro Objective 1: Switch Setup and Configuration, All Questions	4			20	
A.3: TestOut Switching Pro Objective 2: Switch Interface Configuration, All Questions	4			20	
A.4: TestOut Switching Pro Objective 3: TCP/IP Configuration, All Questions	3			15	
A.5: TestOut Switching Pro Objective 4: VLAN Configuration, All Questions	11			55	
A.6: TestOut Switching Pro Objective 5: InterVLAN Routing, All Questions	4			20	
A.7: TestOut Switching Pro Objective 6: Spanning Tree Configuration, All Questions	5			25	
A.8: TestOut Switching Pro Objective 7: Switch Security, All Questions	3			15	
A.9: TestOut Switching Pro Objective 8: EtherChannel Configuration, All Questions	2			10	
A.10: TestOut Switching Pro Certification Practice Exam	15			75	
Total	51			4:15	
B.0: TestOut Routing Pro Practice Exams	Number of Questions		Time		
B.2: TestOut Routing Pro Objective 1: Router Setup and Configuration, All Questions	4			20	
B.3: TestOut Routing Pro Objective 2: Router Interface Configuration, All Questions	15			75	

B.4: TestOut Routing Pro Objective 3: IP Routing Implementation, All Questions	6	30
B.5: TestOut Routing Pro Objective 4: OSPF Routing Configuration, All Questions	4	20
B.6: TestOut Routing Pro Objective 5: EIGRP Routing Configuration, All Questions	3	15
B.7: TestOut Routing Pro Objective 6: Access Control List Configuration, All Questions	7	35
B.8: TestOut Routing Pro Objective 7: NAT Configuration, All Questions	4	20
B.9: TestOut Routing Pro Objective 8: DHCP Server Configuration, All Questions	3	15
B.10: TestOut Routing Pro Objective 9: Router Security Configuration, All Questions	1	5
B.11: TestOut Routing Pro Objective 10: High Availability Configuration, All Questions	2	10
B.12: TestOut Routing Pro Certification Practice Exam	15	75
Total	64	5:20
C.0: Cisco 100-105 ICND1 Practice Exams	Number of Questions	Time
C.2: ICND1 Objective 1.0: Network Fundamentals, All Questions	166	2:46
C.3: ICND1 Objective 2.0: LAN Switching Fundamentals, All Questions	93	1:33
C.4: ICND1 Objective 3.0: Routing Fundamentals, All Questions	55	0:55
C.5: ICND1 Objective 4.0: Infrastructure Services, All Questions	50	0:50
C.6: ICND1 Objective 5.0: Infrastructure Maintenance, All Questions	99	1:39
C.7: ICND1 Certification Practice Exam	60	1:00
Total	523	8:43

D.0: Cisco 200-105 ICND2 Practice Exams	Number of Questions	Time
D.2: ICND2 Objective 1.0: LAN Switching Technologies, All Questions	46	230
D.3: ICND2 Objective 2.0: Routing Technologies, All Questions	85	1:25
D.4: ICND2 Objective 3.0: WAN Technologies, All Questions	54	0:54
D.5: ICND2 Objective 4.0: Infrastructure Services, All Questions	87	1:27
D.6: ICND2 Objective 5.0: Infrastructure Maintenance, All Questions	36	180
D.7: ICND2 Certification Practice Exam	60	1:00
Total	368	11:36
E.0: Cisco 200-125 CCNA Practice Exams	Number of Questions	Time
E.2: CCNA Objective 1.0: Network Fundamentals, All Questions	172	2:52
E.3: CCNA Objective 2.0: LAN Switching Technologies, All Questions	115	1:55
E.4: CCNA Objective 3.0: Routing Technologies, All Questions	145	2:25
E.5: CCNA Objective 4.0: WAN Technologies, All Questions	59	0:59
E.6: CCNA Objective 5.0: Infrastructure Services, All Questions	82	1:22
E.7: CCNA Objective 6.0: Infrastructure Security, All Questions	98	1:38
E.8: CCNA Objective 7.0: Infrastructure Management, All Questions	90	1:30
E.9: CCNA Certification Practice Exam	60	1:00
Total	821	13:41
Total Practice Exam Time 43:35		