CCNA 3 version 3.1 Plan for Academy Student Success (PASS)

CCNA 3 v3.1 Instructional Update # 2004-2

This Instructional Update has been issued to provide guidance to the Academy instructors on the flexibility that they now have to ensure that student populations, with diverse learning needs, can successfully achieve core CCNA 3 v3.1 course objectives.

Each target indicator (TI), or enabling objective, is the basic unit of the curriculum. It is typically one text frame with graphics and several media content items in the form of text, graphics, or animations. To provide more flexibility for instructors who teach CCNA 3 v3.1, all TIs and labs are classified as either core or optional. Core TIs and labs should be taught to prepare students to successfully design, build, and maintain networks, to do well in subsequent classes, and to pass the CCNA Certification Exam. Optional TIs do not have to be taught and are not tested on the CCNA 3 v3.1 module exams or Final Exam. These changes give instructors the freedom to omit or condense TIs and labs in order to save time or reduce the level of difficulty. CCNA 3 v3.1 may be the most difficult CCNA course for many students.

CCNA 3 v3.1 contains more CCNA Certification related material than the other CCNA courses. While this PASS document suggests some flexibility for instructors, it is not as extensive as the CCNA 1, 2, and 4 PASS documents. Worldwide Education (WWE) is continuing to investigate options for making CCNA 3 v3.1 less difficult to teach. Details about these changes are explained in the following sections.

Part 1: Core and Optional TIs and Labs

LO Number	Title	Core TIs	Optional TIs	Core Labs	Optional Labs
1.1	VLSM	All	None	1.1.4	None
1.2	RIP Version 2	All	None	1.2.4, 1.2.5, 1.2.6	1.2.3
2.1	Link-state Routing Protocol	All	None	None	None
2.2	Single area OSPF Concepts	All	None	None	None
2.3	Single area OSPF Configuration	All	None	2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 2.3.6 Combine 2.3.4 with 2.3.5	None
3.1	EIGRP Concepts	All	None	None	None
3.2	EIGRP Configuration	All	None	3.2.1, 3.2.3	None
3.3	Troubleshooting Routing Protocols	All	None	None	None

LO Number	Title	Core TIs	Optional TIs	Core Labs	Optional Labs
4.1	Introduction to Ethernet/802.3 LANs	None	This LO is a review of CCNA 1 topics	None	None
4.2	Introduction to LAN Switching	All	None	None	None
4.3	Switch Operation	All	None	None	None
5.1	LAN Design	All	None	None	None
5.2	LAN Switches	All	None	None	None
6.1	Starting the Switch	All	None	None	None
6.2	Configuring the Switch	All	None	6.2.1-6.2.4, 6.2.6, 6.2.7a, 6.2.7b, 6.2.8 Combine 6.2.3 with 6.2.4	6.2.5, 6.2.9
7.1	Redundant Topologies	All	None	None	None
7.2	Spanning-Tree Protocol	All	None	7.2.4, 7.2.6	None
8.1	VLAN Concepts	All	None	None	None
8.2	VLAN Configuration	All	None	8.2.3, 8.2.4, 8.2.6 Combine 8.2.4 with 8.2.6	None
8.3	Troubleshooting VLANs	All	None	None	None
9.1	Trunking	All, but omit any references to CAT OS	None	9.1.5a or 9.1.5b	None
9.2	VTP	All	None	9.2.5	None
9.3	Inter-VLAN Routing Overview	All	None	None	9.3.6
Case Study	Routing and Switching Case Study	Required, with timing and format to be determined by the Local Academy. Excellent as extra lab work for students and as a review for the Certification Exam.			

Part 2: FAQs

1. What has the Networking Academy done about the issues raised regarding CCNA 3 v3.0?

The Cisco Networking Academy Program team wants to ensure the best possible student outcomes. Concerns regarding reading level difficulties, course pacing, errors in the curriculum and exams, and new exam formats have been addressed in the following ways:

- Corrections to exams and the curriculum

- Improved readability

- Removal of overly detailed exam items

- Partial credit scoring of CCNA 3 v3.1 module exams and Final Exam

- Distribution of an outline of the core topics in the curriculum

- Release of Instructional Updates that give instructors ways to simplify the curriculum and assessments

2. What is an Instructional Update?

The Networking Academy program will periodically release Instructional Updates. Theses updates will address problems or highlight opportunities to conform the teaching of Academy courses to the needs of instructors and students. Feedback from the Academy community suggests that the curriculum and assessment in CCNA 3 v3.1 are too difficult for some student populations. The basic commitment of the Networking Academy program is to ensure the success of students. Instructional Updates will be issuedto give instructors the ability to help their students to succeed. Curriculum, assessment, and instruction must form an integrated whole, therefore, all three areas will be considered together.

3. What are the instructional guidelines? How can these guidelines influence the way instructors manage their classes?

Instructors are allowed to combine curricular materials, lab exercises, and assessments to fit the particular needs of their Local Academy. Instructors should also consider the unique mixture of class periods, student-to-equipment ratios, student needs, and other factors that characterize their local teaching situations. The curriculum and assessments should be used as resources to prepare students for the rest of the program. Students that complete CCNA 3 v3.1 should have a mastery of the basic ideas of Variable Length Subnet Masking (VLSM), RIP v2, single area Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), command-line interface (CLI) switch configuration, and IOS configuration of Virtual LANs (VLANs), Spanning-Tree Protocol (STP), and VLAN Trunking Protocol (VTP) on switches. These ideas must be mastered for the completion of CCNA 3 v3.1. A lack of mastery of other CCNA 3 topics will not interfere with the future success of students. Instructors are encouraged to use the CCNA 3 v3.1 Instructor Guide to direct their instructional practices. The Instructor Guide is available from the View Official Course Materials page for the CCNA 3 class.

4. What are the curriculum guidelines? Has the curriculum rule "add anything, subtract nothing" been modified?

This Instructional Update is meant to help instructors focus on core TIs and labs. Use this update and the extensive CCNA 3 v3.1 Instructor Guide to assist in this process. Optional TIs do not have to be taught and they are not tested on the CCNA 3 v3.1 Assessments. Optional TIs can be used to supplement the course or to answer issues raised by students who desire additional information on various areas of networking. Out of 153 TIs, 9 have been designated as optional. This six percent decrease is not as extensive at addressing community concerns such as difficulty, pacing, reading

level, and lack of time for hands-on labs as are the CCNA 1, 2, and 4 PASS documents. However, the CCNA 3 v3.1 course is particularly important for preparation for the Certification Exam. If the primary goal of the student is not certification, several of the advanced CCNA 3 v3.1 topics could be omitted. If certification is a primary goal, these advanced topics could be covered quickly and re-examined in CCNA 4. WWE is investigating other ways to increase the ease of teaching CCNA 3 v3.1. While all 153 TIs contain valuable information, the relative importance of the TIs allows the designation of core TIs as more important than optional TIs.

5. What are the assessment guidelines? Can instructors omit module exams?

The Academy program only requires students to complete the online Final Exam, the Skills-based Assessment and the course feedback. Other assessments are optional and should be used at the discretion of each instructor. A steady progression of challenging assessment is both good instructional practice and good preparation for the CCNA Certification Exam. The CCNA 3 v3.1 exams do not contain tasks related to optional CCNA 3 TIs.

6. Is CCNA 3 v3.1 less hands-on than CCNA 3 v3.0?

CCNA 3 v3.1 does not have fewer hands-on activities than CCNA 3 v3.0. There are five broad categories of hands-on labs as follows:

- VLSM planning exercises which are then applied to a real network

- Routing protocol labs that focus on RIP v2, single area OSPF, and EIGRP

- Basic CLI configuration of IOS switches that include VLANs

- Advanced switch configurations such as STP and VTP

- A VLSM/Routing protocol/VLAN focused case study which could be subdivided into multiple labs

7. What about the Routing and Switching Case Study?

The Routing and Switching Case Study is required. However, the timing and format are determined by the Local Academy. The case study can be an excellent activity for the course. The case study could also be assigned over the course of the semester, subdivided into smaller labs. For students in a higher education environment, instructors may want to emphasize design.

8. What lab equipment should instructors have for CCNA 3 v3.1?

Lab equipment requirements for CCNA 3 v3.1 include the following:

- All tools, materials, and test equipment for the Routing and Switching Case Study

- Ethernet and serial cables, PCs, and hubs

- The Academy bundle with three switches and six routers for students to cable and configure switched and routed networks

- Some form of protocol analysis software such as Fluke Protocol Expert™ or Fluke Optiview Console ™

- Access to NETLAB is optional, but highly recommended

9. What instructional resources should instructors have and where can they be obtained?

Instructors should download Packet Tracer 3.1, and the forthcoming updated Packet Tracer 3.2, and distribute it to all of their students. This free, powerful simulation environment can be used to teach many of the concepts in CCNA 1 - 4, v3.1. Instructors should also have the most recent CCNA 3 v3.1 Instructor Guide. Extra hands-on labs, extra e-Labs, and the Router eSIM simulator are all available for distribution to students. Practice is crucial. This is especially true for those trying to learn a skill, such as CLI switch configuration. Make sure all students have access to all of the free tools. To obtain these materials and others materials currently in development, go to the Tools section on the Academy Connection website.

10. How do instructors report errors or get help?

There is a Help link at the top right of each page in the Academy Connection where support and bug reporting features are available.

11. Where do instructors go to discuss topics like this Instructional Update?

CCNA communities and discussion boards provide a forum in which instructors can discuss Academy-related issues. New instructional information and materials will also be posted at this site on a frequent basis. All instructors are encouraged to participate. The Forums and Chat link is located under Resources on the Academy Connection homepage. Click on any of the discussion thread topics to join in.

12. How would this Instructional Update be used in a learning environment?

A group of eleventh grade students have completed a CCNA 2 v3.1 class and are now starting a CCNA 3 v3.1 class. The instructor that taught this CCNA 2 v3.1 class used the flexibility indicated in the CCNA 2 v3.1 PASS document and focused on engaging this large class of 24 students. These students are skilled in IP subnetting, basic router configuration, working with static routes, RIP v1, IGRP, and ACLs. The students continue to learn more vocabulary, but the experience the instructor had with these students in CCNA 2 v3.1 indicated that they have a wide range of learning needs. The instructor plans to teach the course using one standard bundle of equipment, which includes six routers and three switches. The instructor notes that some of the topics seem rather difficult, and wishes more lab equipment was available. With this knowledge, the instructor decides to use the following strategy:
- Provide access to a CCNA 3 v3.1 survival kit to all students. This kit consists of Packet Tracer 3.2, CCNA v3.1 e-Labs, and Router eSIM as pre-lab activities and as post-lab activities for review. The e-Labs, Router eSIM, Packet Tracer, and other resources can be downloaded by logging into Academy Connection at http://cisco.netacad.net. Click on the Tools link under the Resources heading, then select the CCNA Course 1 - 4 link.
- Combine the 27 core labs wherever possible, for greater instructional efficiency.
- Assign appropriate CCNA 3 v3.1 curriculum e-Labs, Packet Tracer assignments, and Router eSIM as pre-lab activities. These are to be completed prior to rotating to the hands-on labs, and as post-lab activities for review. This strategy was devised because student groups will have to rotate through hands-on time with the routers and switches.
- Contact the Regional Academy and the school district to inquire about NETLAB.
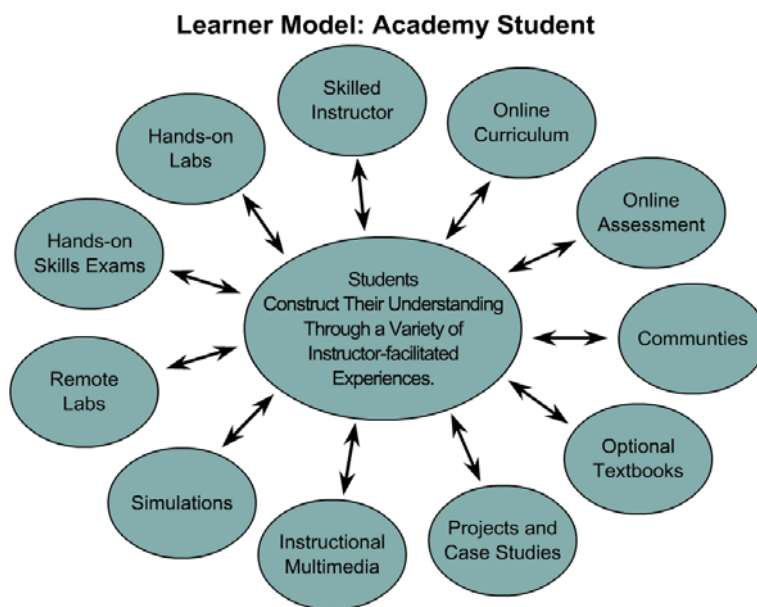- Obtain e-Lab Composer, a new tool that will allow this instructor to write custom e-Labs.

- Administer several module exams as informal in-class practice and modify the weighting of those exams in the Gradebook.
- Emphasize the following four things:
    - Mastery of VLSM
    - Configuration of RIP v2, single area OSPF, and EIGRP
    - CLI configuration of IOS switches
    - VLANs and VTP
- Divide the case study into a semester-long series of additional assignments and labs.
- Omit advanced TIs concerning OSPF authentication, DUAL EIGRP algorithm, VLAN troubleshooting, and parts of VTP, even though these TIs are not declared optional. Explain to students that the advanced TIs are important for the Certification Exam, but that there is not enough time in the semester to cover them. Adjust the grading of the online Final Exam and the Skills-based Assessment accordingly. A re-examination may be done in CCNA 4.
- Cover Modules 4 and 5 quickly, primarily as a review of CCNA 1 topics.

Later, the instructor plans to go back to any core and optional TIs that were quickly covered. The instructor will then use any module exams that are considered appropriate. In-class activities are designed and added to the class Gradebook on Academy Connection. The instructor has also modified the scoring of module exams so they align better with the needs of the students. The instructor also decides to use the weighted score instead of the binary score in the Gradebook. Because so many different tools were used throughout the course, the students' final course grades are based on module exams, informal quizzes, and e-lab activities that have been completed.

Part 3: CCNA 3 version 3.1 Instructional Guidelines

Student-centered, instructor-facilitated

The Cisco Networking Academy Program is based on instructor facilitation. The Learner Model: Academy Student diagram emphasizes the central role of students. Instructors utilize activities that are built from a variety of resources to help their students achieve the desired comprehension of networking. The CCNA curriculum has not been designed as stand-alone e-learning, 100 percent distance-learning, or programmed instruction that is to be followed literally step-by-step regardless of the learner.

Learner Model: Academy Student

- Skilled Instructor
- Online Curriculum
- Online Assessment
- Communties
- Optional Textbooks
- Projects and Case Studies
- Instructional Multimedia
- Simulations
- Remote Labs
- Hands-on Skills Exams
- Hands-on Labs

Students Construct Their Understanding Through a Variety of Instructor-facilitated Experiences.

One curriculum does not accommodate all students

The Cisco Networking Academy Program is used by hundreds of thousands of students in almost 150 countries. Students vary from teenagers to mature adults, at different levels of education. One curriculum cannot be perfect for all students, so the Networking Academy program team continually strives to build a program that gives instructors the flexibility to meet a variety of learning needs. Local instructors utilize the learning goals of the program and the resources described in the learner model to make the program work for their students. Instructors are given the following reference points, which relate to the mission of the Cisco Networking Academy Program, to plan their instruction:

- To educate future networking professionals

- To train students to meet the requirements of the CCNA Certification Exams

- To develop students' hands-on skills, which are essential for success in the networking industry and further education

Differentiation based on class requirements is encouraged. Struggling students should be given remediation and high-achieving students should be given further challenges. The instructor should decide how much time to spend on various topics. Some topics can be emphasized and other topics can be de-emphasized or omitted for different students. Only the local instructor can decide how to balance the need to do hands-on labs with the realities of the local student-to-equipment ratio and time schedule. Use of the Instructor Guide and online communities may facilitate preparation of lesson plans and presentations. Instructors are strongly encouraged to develop in-house labs and exercises.

Hands-on, skills-based

The core of the CCNA 3 v3.1 experience is a sequence of hands-on labs. Each lab has been designated as either core or optional. Core labs are fundamental to the CCNA Academy student experience, certification test requirements, job success, and cognitive and affective development. In CCNA 3 v3.1, students must learn to address a network using VLSM, work with routing protocols RIP v2, single area OSPF, EIGRP, and master the configuration of IOS switches. Students should also participate in some locally determined form of the Routing and Switching Case Study.

The Cisco Networking Academy Program teaching and learning community

Cisco Networking Academy Program instructors are members of a global community of educators. More than 10,000 individuals are actively teaching the CCNA and CCNP courses. Instructors are encouraged to take advantage of this community through their Regional Academy (RA), their Cisco Academy Training Center (CATC), the Cisco Academy Connection, and through other forums. It is the commitment of WWE to improve the curriculum, assessment, and instructional resources. Feedback can be submitted through the Academy Connection by clicking on the Help link on the site. Please continue to check the Academy Connection for regular releases of instructional materials.

Part 4: CCNA 3 version 3.1 Curriculum Guidelines

Course objectives

The CCNA certification indicates knowledge of networking for the small office, home office (SOHO) market. The certification also indicates the ability to work in small businesses or organizations with networks that have fewer than 100 nodes. An individual with the CCNA designation should be able to perform the following tasks:

- Install and configure Cisco switches and routers in multiprotocol internetworks using LAN and WAN interfaces

- Provide Level 1 troubleshooting service

- Improve network performance and security
- Perform entry-level tasks in the planning, design, installation, operation, and troubleshooting of Ethernet and TCP/IP networks

The CCNA 3 v3.1 course is an important step toward achieving CCNA certification. Upon completion of the course, students should be able to perform tasks related to the following:

- VLSM
- Intermediate Routing Protocols RIP v2, single area OSPF, and EIGRP
- CLI switch configuration
- Ethernet switching
- VLANs
- STP
- VTP

Instructors may decide to omit a given TI or assessment. However, they should consider the impact of their instructional decisions on the ability of students to achieve these broad learning objectives. Core and optional TIs and labs have been designated after careful consideration of these impacts.

Part 5: CCNA Assessment Guidelines

Background and context

The Networking Academy program assessment tools help students, instructors, and administrators understand the personal and individual strengths and weaknesses as they progress through the curriculum. Cisco Systems, Inc. and WWE do not specify the exact instructional actions and uses for assessment activities. Instead, Cisco offers suggestions and sets standards for minimum acceptable course delivery in the Quality Assurance Program documents.

Assessment is the process used to describe the knowledge, skills, and abilities of individuals based on the collection of data. Assessment can consist of informal activities such as class discussions, one-on-one discussions, and unobtrusive observations of students in the classroom or at work. There are also more formal or standardized assessments. These can include sets of tasks or questions combined into a test, an organized performance, or other activities that are staged to gather information about the knowledge, skills, and abilities of students.

Assessments have various uses and purposes as follows:

- Some assessments are designed to give detailed feedback about the particular strengths and weaknesses of a student. These activities are called formative assessments because they help form the learning process.
- Summative assessments are designed to summarize the knowledge or skills of a student. Summative assessments usually cover a broader range of information than formative assessments, and give a less detailed report. An end-of-course exam, or Final Exam, is usually created with this type of summative goal.
- In the Cisco Networking Academy Program, all assessments are created to improve learning.

Formative assessments assist students and instructors directly with detailed information and a firm connection to the curriculum. Summative assessments are also related to the curriculum. However,

they provide a more global view of learning, which may help students, instructors, and administrators obtain improved learning with this broad information.

The assessment tools provided in the Networking Academy program are designed to be as flexible and appropriate as possible. Cisco believes that the most flexible and appropriate assessment tool is the instructor. Therefore, instructors are encouraged to become highly skilled in the curriculum. Instructors should use the assessment tools provided in the manner that best improves learning and matches the administrative goals of their school. Instructors should supplement these tools with any activities that they deem necessary.

Multiple sources of information are needed

The Networking Academy program recognizes that the appropriate use of online exams may vary for different instructors and institutions. Instructors should always follow locally provided guidelines, when available, with regards to exam use. The Networking Academy program assessment team also has recommended guidelines about how exams should be used.

Online assessments should be considered as one of several sources of information that should be used to make decisions or assign grades. A single test should never be used to determine a course grade. Instructors should consider other sources of information, including performance on the Skills-based Assessment and other indicators of classroom performance when they assign grades to students.

The online assessments are designed to primarily provide information about the knowledge a student has regarding networking concepts and procedures. It is essential for hands-on assessments, such as cabling and router configuration, to be used in the classroom, to appropriately assess the total set of knowledge, skills and abilities of a student.

Which assessments are required?

Student grades and course graduation requirements should be obtained from multiple sources in addition to the online assessments. Such activities may include class participation or presentations, and competencies in the Skills-based Assessment and Routing and Switching Case Study. The exact configuration and grading decision will be determined by the policies of the Local Academy and instructor. Each Local Academy should establish course evaluation criteria, which will be provided to students at the beginning of the course. Currently the Networking Academy program requires students to complete, at a minimum, the following tasks for CCNA 3 v3.1:

- Complete the online Final Exam
- Complete the online Course Feedback Form
- Complete the Skills-based Assessment
- Complete the Routing and Switching Case Study

The scores from the Final Exam and Course Feedback Form will be automatically entered into the Gradebook when completed. The instructor must manually enter the scores from the Skills-based Assessment and the Routing and Switching Case Study into the Gradebook.

Not all assessments within a course will be required to complete the course. Some assessments are optional to provide local instructors greater flexibility within the classroom and allow them to decide how to teach and create evaluation tasks. It is important to note that most content areas from the course are likely to be found on required assessments such as the Final Exam.

Certification Exam and CCNA online assessments

The Academy curriculum is an excellent resource for learning the skills and knowledge that are tested on the CCNA Certification Exam. The types of tasks that students must complete on the Certification

Exam are similar to the types of activities that well-trained Academy students can complete. However, good performance on the online module exams and the Final Exam may not necessarily guarantee success on the Certification Exam. Most students consider the Certification Exam to be more challenging. This exam measures the ability of students to combine the knowledge gained from all CCNA courses, while module exams or quizzes generally cover small pieces of information. The Certification Exam also requires students to apply networking skills in real networking situations. The skills-based assessments, case studies, hands-on activities, and lab performance are as important as the online module exams and online final exams. Students who memorize test questions and answers out of context, and students with no experience or limited experience solving real network problems on real network equipment will be at a disadvantage when they take the Certification Exam.