



Cisco Networking Academy  
Mind Wide Open

# FREE Linux Course Materials

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# Agenda

- Full Disclosure (Cisco Networking Academy, TRECA, NDG, & LPI)
- Introduction to the Cisco Networking Academy curriculum offerings
- Linux Professional Institute (LPI) Certifications
- NDG Partnership with Cisco and LPI
- FREE NDG Linux Curriculum
- More NDG Linux Curriculum
- Becoming a Cisco Networking Academy
- Instructor Training Opportunities

# Curriculum Portfolio

ICT & Networking Skills

Courses

NDG Linux Essentials      CCNP      Get Connected\*      Intro to Cybersecurity

LPIC 101 & 102\*

Intro to IoE  
IoE Connecting Data\*  
IoE Connecting Things\*

Career Skills

Courses

Learning Tools

Outcomes

	Certification
	CompTIA A+
	Cisco CCENT
CCNA R&S (courses 1-4)	Cisco CCNA R&S
CCNP	Cisco CCNP
CCNA Security	Cisco CCNA Security
NDG Linux Essentials	Linux Essentials Certificate of Achievement
LPIC 1	Linux Professional Institute Certification

\* Planned

# Is Linux a Job Skill in Demand?

Keyword	Dice.com	Indeed.com
Cisco	3,809	23,689
Citrix	986	6,841
<b>Linux</b>	<b>8,185</b>	<b>56,514</b>
Microsoft	12,911	326,755
Storage	3,647	119,129
VMware	2,820	18,889

As of January 28<sup>th</sup>, 2015

# Why Align Courses to Linux Professional Institute Certifications?

- **About LPI.ORG: vendor neutral – open source alignment**

Linux and Open Source nonprofit certification organization

Not a Linux distribution vendor

Supported by open source community

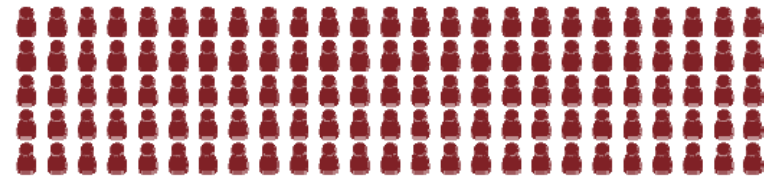
Community creates certification questions



## Linux Professional Institute



**135,000+**  
LPI Certified Professionals



**375,000+**  
Total Exams Given



**27**  
Master Affiliate  
Country Offices



**60**  
Global Annual  
Events



**7**  
Exam  
Languages

# Who is the Linux Professional Institute?

- **Leading vendor-independent Linux certification organization**
- **Providing professional level Linux certifications since 1999**
- **Candidates are tested across multiple distributions of Linux ensuring they have core skills required for today's jobs**



# Why Align Courses to Linux Professional Institute Certifications?

- **Course and certificate align to Linux skills**

Teaching to “core” Linux knowledge

Learners demonstrate to employers Linux competence

Learners can choose specific Linux distributions as career

Knowledge of various distribution and experience progress



# Why Open Source Alignment for Academia?

- **Vendor neutral lowers cost to academic institution**
- **Avoids costs associated with joining programs, licensing fees**
- **Specific distributions increase labor and cost for instructors to prepare to teach in the classroom**





# Linux Pathways



# LPI Linux Essentials Certificate Program



- Entry-level credential
- Professional Development Certificate
- One exam: Linux Essentials\*
- Audience: new Linux users or professionals looking to expand skill set
- Compliments Cisco CCENT and CCNA. Demonstrates to employers that an individual is motivated to learn Linux

*\* Not available in Japan*



# Linux Essentials Course



# Linux Essentials Course

## Relationship

- Partner to Cisco Networking Academy, 12+ years

## Mission

- Help academic institutions teach IT

## Develop software to help academic institutions

- NDG NETLAB+ is used to host Cisco equipment
- NDG NETLAB+ is used to host virtual learning labs
- 6000+ Cisco devices hosted by academic institutions

## Develop instructional content aligned to jobs

- Help academic programs with new lab content
- Develop courses to help IT learners with job skills



**Network Development  
Group**

[www.netdevgroup.com](http://www.netdevgroup.com)

# NDG Linux Essentials Course Information

## **Developed, offered and supported by NDG**

NDG is responsible for all Linux Essentials course content  
NDG hosts and manages Linux Essentials virtual machines

## **Course is available to Cisco Networking Academy schools for instructor-led implementation**

Available via Cisco NetSpace  
No cost\* for Instructor-Led Training (ILT)

## **Aligned to LPI.ORG Linux Essentials Certificate**

Linux Professional Institute (LPI.ORG)  
Linux Essentials Professional Development Certificate  
Students that pass the course receive a congratulatory letter and  
20% discount voucher for LE certificate exam at a Pearson VUE

\* Exception: participants at an ACC or other NetAcad for-profit license program

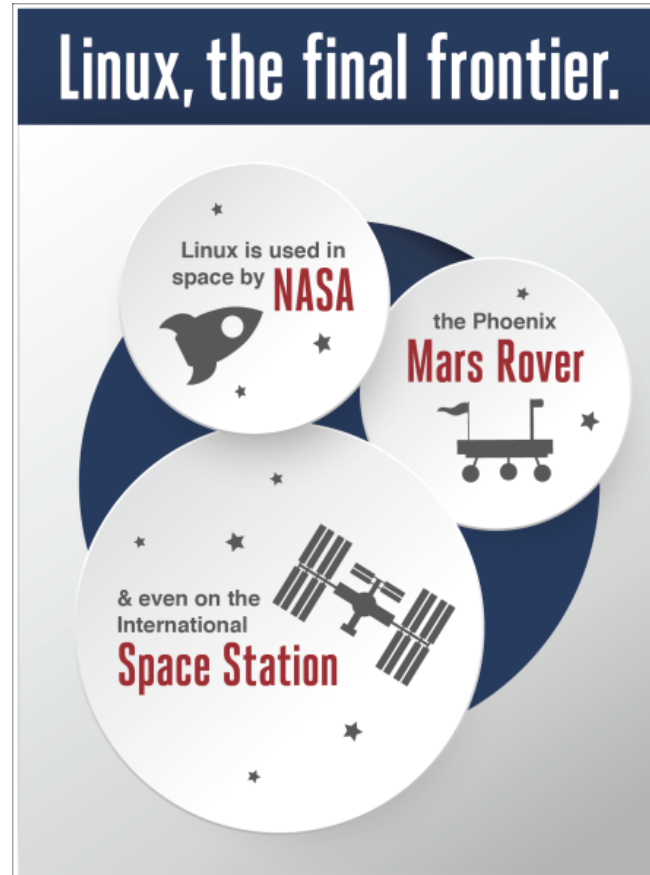
# NDG Linux Essentials Course Content



- Designed to be a full semester course
  - With lectures, content, labs and assessments
- Sixteen (16) chapters
- Thirteen (13) lab exercises
- Assessments
  - Chapter, midterm and final
- Instructor presentations for each chapter
- Current release is English only

# NDG Linux Essentials Course Goals

- Help learners start to learn Linux
- Align course to LPI.ORG Linux Essentials certificate
- Help learners complement other skills with “beginning knowledge of Linux”



# NDG Linux Essentials Course Modules

Title of Learning Module / Chapter	LPI.ORG Linux Essentials Certificate Objectives Covered
1 Introduction to Linux	1.1 Linux Evolution and Popular Operating Systems
	4.1 Choosing an Operating System
2 Open Source Applications and Licenses	1.2 Major Open Source Applications
	1.3 Understanding Open Source Software and Licensing
3 Using Linux	1.4 ICT Skills and Working in Linux
4 Command Line Skills	2.1 Command Line Basics
5 Getting Help	2.2 Using the Command Line to Get Help
6 Working with Files and Directories	2.3 Using Directories and Listing Files
	2.4 Creating, Moving and Deleting Files
7 Archiving and Compression	3.1 Archiving Files on the Command Line
8 Pipes, Redirection, and REGEX	3.2 Searching and Extracting Data from Files
9 Basic Scripting	3.3 Turning Commands into a script
10 Understanding Computer Hardware	4.2 Understanding Computer Hardware
11 Managing Packages and Processes	4.3 Where Data is Stored
12 Network Configuration	4.4 Your Computer on the Network
13 System and User Security	5.1 Basic Security and Identifying User Types
14 Managing Users and Groups	5.2 Creating Users and Groups
15 Ownership and Permissions	5.3 Managing File Permissions and Ownership
16 Special Permissions, Links and File Locations	5.4 Special Directories and Files



# NDG Linux Essentials Course in Cisco Networking Academy

The screenshot shows the Cisco Networking Academy interface for the NDG Linux Essentials course. The top navigation bar includes the Cisco logo, the course name, and links for Home, Info, Settings, Logout, and Help. Below this is a secondary navigation bar with tabs for Courses, Assignments, Grades, and Calendar. The main content area is divided into a left sidebar with a course menu (Home, Announcements, Modules, Grades, Assignments, Discussions, People, Pages, Files, Syllabus, Outcomes, Quizzes, Help & Resources, Settings) and a main content area. The main content area features the course title "NDG Linux Essentials", a description of the course, a large NDG logo with the website URL "www.netdevgroup.com", and a "Go to the Modules List to get started!" link. On the right side, there is a sidebar with buttons for "Course Setup Checklist", "New Announcement", "View Course Analytics", "All Pages", "Front Page", "Edit This Page", and "Create a New Page". The footer contains links for Terms and Conditions, Privacy Statement, Cookie Policy, and Trademarks, along with the text "Canvas By Instructure" and the NetSpace logo.

# Course Content with Virtual Machine = Learn by Doing!

Linux Essentials Help -

## 1.3.3 Role of Open Source

Linux started out in 1991 as a hobby project by Linus Torvalds. He made the source freely available and others joined in to shape this fledgling operating system. His was not the first system to be developed by a group, but since it was a built-from-scratch project, early adopters had the ability to influence the project's direction and to make sure mistakes from other UNIXes weren't made.

Software projects take the form of *source code*, which is a human readable set of computer instructions. The source code may be written in any of hundreds of different languages, Linux just happens to be written in C, which is a language that shares history with the original UNIX.

Source code is not understood directly by the computer, so it must be compiled into machine instructions by a *compiler*. The compiler gathers all of the source files and generates something that can be run on the computer, such as the Linux kernel.

Historically, most software has been issued under a *closed-source license*, meaning that you get the right to use the machine code, but cannot see the source code. Often the license specifically says that you will not attempt to reverse engineer the machine code back to source code to figure out what it does!

*Open source* takes a source-centric view of software. The open source philosophy is that you have a right to obtain the software, and to modify it for your own use. Linux adopted this philosophy to great success. People took the source, made changes, and shared them back with the rest of the group.

Alongside this, was the *GNU project* (GNU's, not UNIX). While GNU was building their own operating system, they were far more effective at building the tools that go along with a UNIX operating system, such as the compilers and user interfaces. The source was all freely available, so Linux was able to target their tools and provide a complete system.

There are many different variants on open source, and those will be examined in a later chapter. All agree that you should have access to the source code, but there differ in how...

Linux Terminal Show/Hide

```
sysadmin@localhost:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
sysadmin@localhost:~$ ls -l
total 32
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Desktop
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Documents
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Downloads
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Music
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Pictures
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Public
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Templates
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Videos
sysadmin@localhost:~$
```

Reset Restart

← Previous Next →

# Virtual Machine Lab Exercises Provide Student Guidance

The screenshot shows a web browser window with the URL `https://content.netdevgroup.com/labs/linux-essentials/4/#`. The page title is "Linux Essentials". On the left, there is a navigation menu with sections: "LAB 4: COMMAND LINE SKILLS", "Introduction", "Linux Essentials Exam Objectives", "Files and directories", "Shell Variables", and "Control Statements". Under "Shell Variables", "Step 2" is highlighted. The main content area is titled "4.3.2 Step 2" and contains the following text:

The next command also displays information contained in the prompt. To be able to see the name of the computer, or `hostname`, on which you are executing commands, type the following in the terminal:

You output should be like the following:

```
sysadmin@localhost:~$ hostname
localhost
sysadmin@localhost:~$
```

From the output of this command, `localhost`, you are able to see the fully-qualified hostname of this computer. Many commands that are executed produce text output like this. You can change what output is produced by a command by using options after the name of the command.

Options for a command can be specified in several ways. Traditionally in UNIX, options were expressed by the hyphen following by another character, for example: `-x`.

In Linux, options can sometimes also be given by two hyphen characters followed by a word, or hyphenated word, for example: `--short`.

On the right side of the page, there is a "Linux Terminal" window showing a terminal session:

```
Ubuntu 12.10 localhost tty
localhost login: sysadmin (automatic login)
Welcome to Ubuntu 12.10 (GNU/Linux 3.8.0-34-generic x86_64)
 * Documentation:  https://help.ubuntu.com/

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

sysadmin@localhost:~$
```

At the bottom of the terminal window, there are "Reset" and "Quit" buttons.

# Assessments: Chapter Quizzes, Midterm and Final

The screenshot displays a web-based assessment interface for 'LINUX101 > Assignments > Chapter 04 Exam'. At the top right, it shows 'Time elapsed: 22 hours, 23 minutes, 29 seconds'. On the right side, there are two blue buttons: 'Edit Assignment Settings' and 'Speed Grader'. The main content area contains three questions:

**Question 1**  
Select all the applications that provide access to the Command Line Interface (CLI)?  
(choose all that apply)

- Virtual Terminal
- opera
- firefox
- Terminal window

**Question 2**  
A pair of single quotes ( ' ) will prevent the shell from interpreting any metacharacter.  
True or False?

- True
- False

**Question 3**  
A pair of double quotes ( " ) will prevent the shell from interpreting any metacharacter.  
True or False?

# Instructor Lecture Materials – PowerPoint Per Chapter

- Aligns to certificate
- Lists objectives
- Helps with lectures

## 4.1 Linux Essentials Exam Objectives

2.1 Basics of using the Linux command line.

Weight: 2

Description: Basics of using the Linux command line.

Key Knowledge Areas:

- a. Basic shell
- b. Formatting commands
- c. Working with Options
- d. Variables
- e. Globbing
- f. Quoting

The following is a partial list of the used files, terms, and utilities:

- a. echo
- b. PATH environment variable
- c. history
- d. which

# NDG Support is All Online

## 5.3.2 Controlling the man Page Display

The `man` command uses a "pager" to display documents. Normally this pager is the `less` command, but on some distributions it may be the `more` command. Both are very similar in how they perform and will be discussed in more detail in a later chapter.

If you want to view the various movement commands that are available, you can type the letter `h` while viewing a man page. This will display a help page (note: If you are working on a Linux distribution that uses the `more` command as a pager, your output will be different than the example shown here):

```
sysadmin@localhost:~
File Edit View Search Terminal Help

SUMMARY OF LESS COMMANDS

Commands marked with * may be preceded by a number, N.
Notes in parentheses indicate the behavior if N is given.

h H Display this help.
q :q Q :Q ZZ Exit.
-----
MOVING

e ^E j ^N CR * Forward one line (or N lines).
y ^Y k ^K ^P * Backward one line (or N lines).
f ^F ^V SPACE * Forward one window (or N lines).
b ^B ESC-v * Backward one window (or N lines).
z * Forward one window (and set window to N).
w * Backward one window (and set window to N).
ESC-SPACE * Forward one window, but don't stop at end-of-file.
d ^D * Forward one half-window (and set half-window to N).
u ^U * Backward one half-window (and set half-window to N).
ESC-) RightArrow * Left one half screen width (or N positions).
ESC-( LeftArrow * Right one half screen width (or N positions).
HELP -- Press RETURN for more, or q when done
```

If your distribution uses the `less` command, you might be a bit overwhelmed with the large number of "commands" that are available. The following table provides a summary of the more useful commands:

```
>_ Linux Terminal Show/Hide

Your lab session is ready. Press the [Enter] key to begin...

sysadmin@localhost:~$
sysadmin@localhost:~$
sysadmin@localhost:~$
```

**Consider This...**

If you want to send your man page to your default printer, then you may want to execute the man command as follows:

# NDG Online Tool to Submit Issues

The screenshot displays the NDG Online Tool interface. A modal window titled "Send us feedback" is open, featuring a dropdown menu with options: "Typo", "Question", "Feedback", "Typo", and "Bug Report". The "Typo" option is currently selected. A "Next" button is located at the bottom right of the modal. In the background, a terminal window titled "Linux Essentials" shows the "less" command help text. The terminal content includes sections for "SUMMARY OF LESS COMMANDS" and "MOVING".

**Linux Essentials**

### 5.3.2 Controlling the man

The `man` command uses a "pager" to display... command, but on some distributions it may be the... they perform and will be discussed in more detail if...

If you want to view the various movement comman... while viewing a man page. This will display a he... distribution that uses the `more` command as a... example shown here):

```
sysadmin@local:~$ less /usr/share/doc/linux-essentials/5.3.2/controlling-the-man-page.html
```

**SUMMARY OF LESS COMMANDS**

Commands marked with \* may be preceded by a number, `N`.  
Notes in parentheses indicate the behavior if `N` is given.

```
h H      Display this help.
q :q Q :Q ZZ  Exit.
```

-----

**MOVING**

```
e ^E j ^N CR * Forward one line (or N lines).
y ^Y k ^K ^P * Backward one line (or N lines).
f ^F ^V SPACE * Forward one window (or N lines).
b ^B ESC-v * Backward one window (or N lines).
z * Forward one window (and set window to N).
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ESC-) RightArrow * Left one half screen width (or N positions).
ESC-( LeftArrow * Right one half screen width (or N positions).
```

HELP -- Press RETURN for more, or q when done

**Consider This...**

If you want to send your man page to your default printer, then you may want to execute the man command as follows:

# Instructor Resources to Teach Introduction to Linux

Help Center

## Frequently Asked Questions

1. How do I activate exams properly using the activation tool?
2. Are any teaching materials provided, such as PowerPoint presentations?
3. Are the chapter modules and lab content available to download for offline use?
4. How are the points earned for the labs?
5. Does this course align to any certification?
6. How can I, as an instructor, view exam questions?
7. What are the minimum requirements for viewing the content of this course?
8. Having trouble navigating through the NetSpace environment?
9. Is the Linux VM capable of being connected to the Internet?
10. Why is the virtual machine not accepting a common command that is an actual command used in another Linux environment?

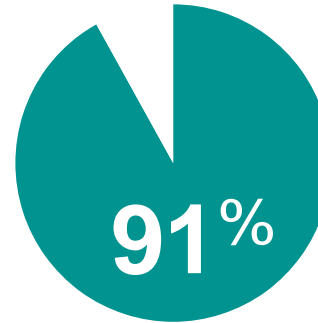
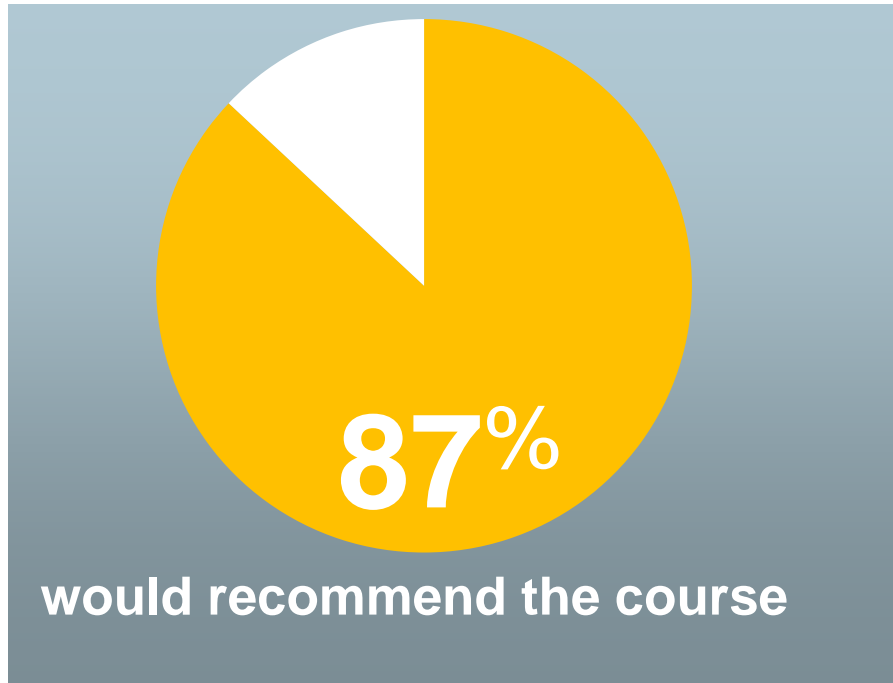
## Resources

- Assessment Tool
- Teaching Materials

- Content available through the Cisco Networking Academy
- Curriculum aligned to a professional certificate
- Virtual machine = no classroom setup
- Power Point slides for lectures
- Assessments in the Cisco Networking Academy



# Linux Essentials – Small Market Trial (SMT)



# Setting Up a Linux Essentials Class



1. From the Cisco Networking Academy home page at [www.netacad.com](http://www.netacad.com), select the Teach tab
2. Select the Create a Course link
3. Enter the course information
  - a. Select an Academy
  - b. Enter a Course Name and Course ID
  - c. Select the course Partner: Linux Essentials
  - d. Choose a language for the course
  - e. Enter a start and conclude date
  - f. Select the instructor
4. Click Save

# Linux Pathways



# 3-in-1 Advantage

2 Exams (101, 102)



3 Professional Certifications



- LPI partners with CompTIA and SUSE
- 2 exams\* yield 3 leading professional Linux certifications
- No additional cost or testing required
- Pass Linux+ to receive Linux+, LPIC-1 and SUSE certification

*\* Not available in Japan*

# NDG LPIC-1 101 Course



# NDG LPIC-1 101 Course Content



- Designed to be a full semester course
  - With lectures, content, labs and assessments
  - Designed to be a 70-hour course
- Higher level of rigor than Linux Essentials
- Twenty Seven (27) chapters
- Twenty Four (24) lab exercises
- Assessments
  - Chapter, midterm and final
- Current release is English only

# NDG LPIC-1 101 Modules

The course aligns to one of two required exams for the LPIC-1 certification. It covers basic skills for the Linux professional that are common to major distributions of Linux.

<b>Module 1</b>	Chapter 1: Using the Shell Chapter 2: Getting Help Chapter 3: Text Utilities Chapter 4: Configuring the Shell	<b>Module 5</b>	Chapter 15: Hardware Configuration Chapter 16: The Boot Process Chapter 17: Bootloaders Chapter 18: Runlevels
<b>Module 2</b>	Chapter 5: File Manipulation Chapter 6: File Globbing Chapter 7: Finding Files	<b>Module 6</b>	Chapter 19: Designing a Scheme Chapter 20: Creating Partitions Chapter 21: Mounting Filesystems
<b>Module 3</b>	Chapter 8: Regular Expressions Chapter 9: The vi Editor Chapter 10: Standard Text Streams and Redirection Chapter 11: Managing Processes	<b>Module 7</b>	Chapter 22: Maintaining Integrity Chapter 23: Fixing Filesystems Chapter 24: Disk Quotas
<b>Module 4</b>	Chapter 12: Archive Commands Chapter 13: File Permissions and Ownership Chapter 14: Filesystem Links	<b>Module 8</b>	Chapter 25: RPM Package Management Chapter 26: Debian Software Management Chapter 27: Managing Shared Libraries

# Professional Certification LPIC-2



- **Professional Certification Level 2**
- **Two exams: 201, 202\***
- **Audience: Advanced Level Linux Systems Administrators**

*\* Not available in Japan*





# Professional Certification LPIC-3



## Professional Certification Level 3

One specialty exam \*

Specialties:

300 – Mixed Environments

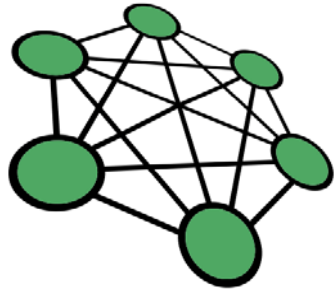
303 – Security

304 – Virtualization & High Availability

**Audience: Senior Level Linux Systems Administrators**

*\* Not available in Japan*

# Becoming a Cisco Networking Academy



ASC  
ALLIANCE

*Davenport University,  
Henry Ford Community College,  
The University of Akron &  
Tri-Rivers Educational Computer Association*

All Cisco Academies must align to an Academy Support Center

For More Information:

No Fee: 2014-2015

IT Essentials Fee 2015-2016: \$200.00

(740) 389-4798 Ext. 254

# Instructor Training Opportunities



**NOTE: No Training Required for Linux Essentials.**

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## INSTRUCTOR TRAINING CENTER

Instructors are trained by TRECA's ITC knowledgeable and experienced trainers:

**Elaine Horn**, CCNA ITQ Certified, TRECA Educational Solutions, Marion, OH

**Pete Anderson**, CCNA ITQ Certified, Davenport University, Grand Rapids, MI

**Lonnie Decker**, CCNA ITQ Certified, Davenport University, Midland, MI

**Debra Keller**, CCNA ITQ Certified, The University of Akron, Akron, OH

**Steve Stiles**, CCNA ITQ Certified, Rhodes State College, Lima, OH

**Paul Burkholder**, CCNA ITQ Certified, Rhodes State College, Lima, OH

**Katie Fitzner**, CCNA ITQ Certified, Henry Ford Community College, Dearborn, MI

**Nathan Carnahan**, IT Essentials ITQ Certified, Rhodes State College, Lima, OH

**Paul Fedele**, IT Essentials ITQ Certified, Calhoun Area Career Center, Battle Creek, MI

Thank you.



Cisco Networking Academy  
Mind Wide Open