

**ITT Technical Institute**  
**NT1430**  
**Linux Networking**  
**Onsite Course**

**SYLLABUS**

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**Credit hours:** 4.5

**Contact/Instructional hours:** 56 (34 Theory Hours, 22 Lab Hours)

**Prerequisite(s) and/or Corequisite(s):**

Prerequisites: NT1210 Introduction to Networking or equivalent

**Course Description:**

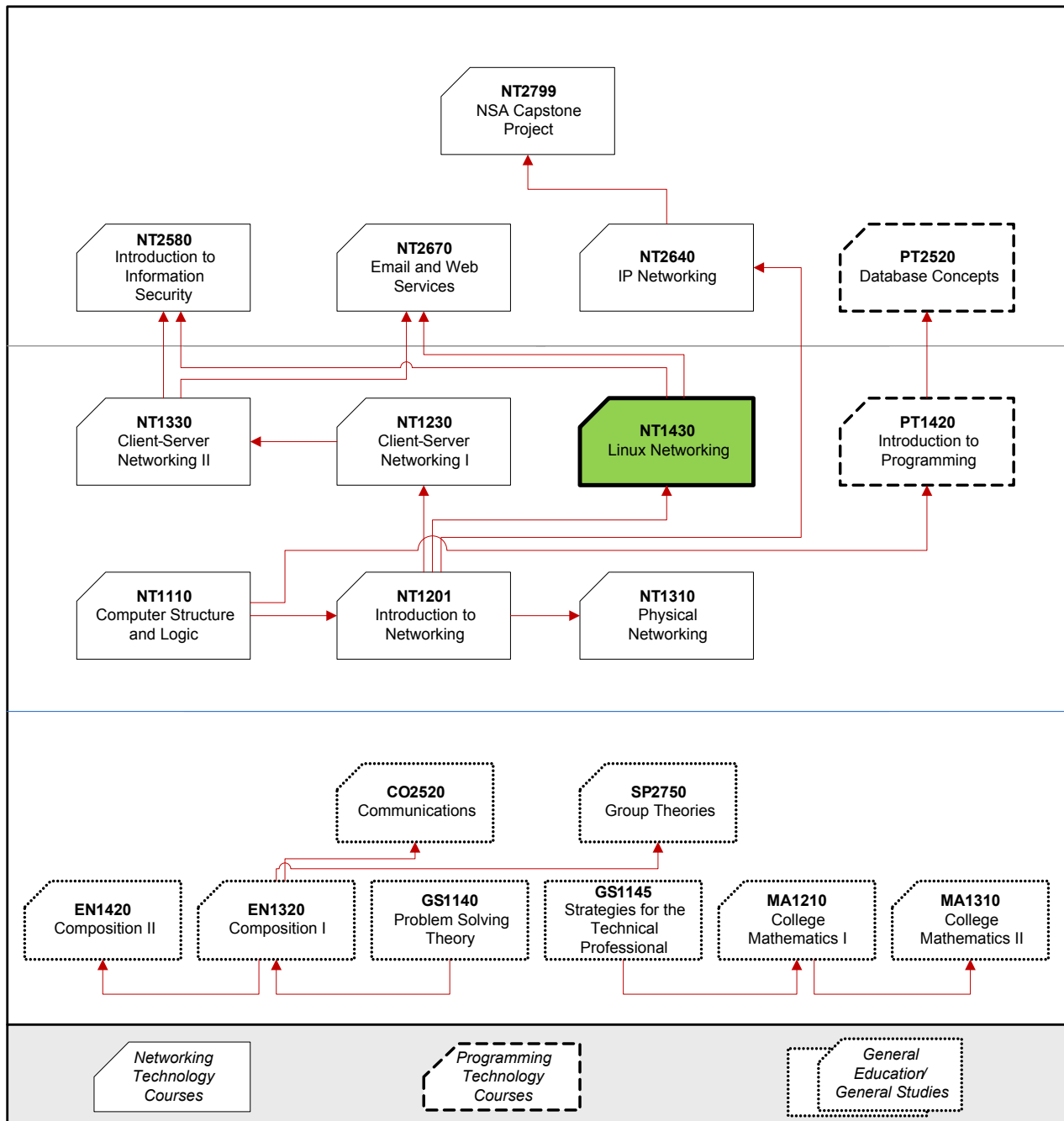
This course explores system and network administrative tasks associated with Linux-based components on a network. Routine tasks in installation, configuration, maintenance and troubleshooting of Linux workstations and servers are considered with emphasis on the network services provided by open source solutions.

# Where Does This Course Belong?

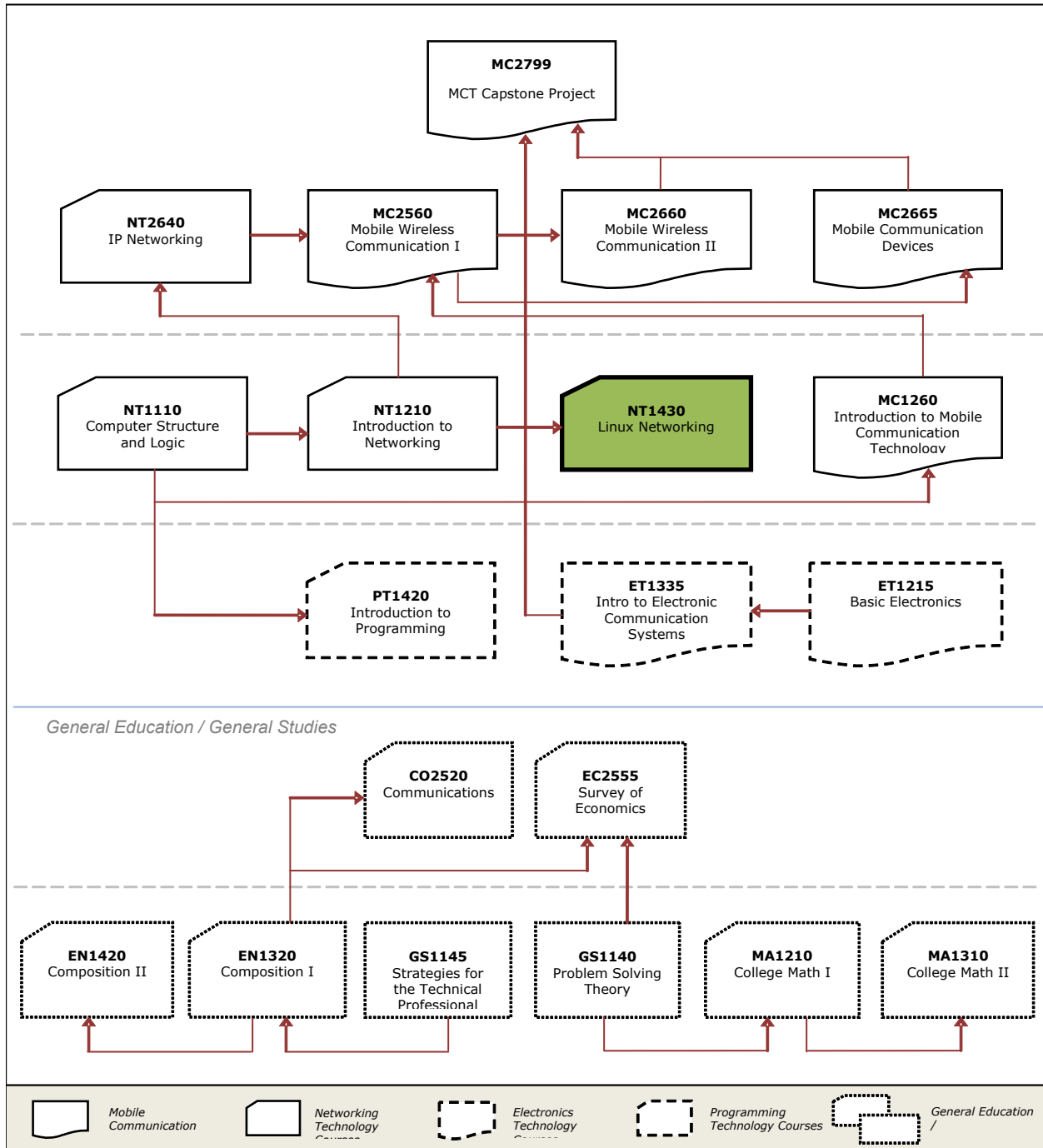
Linux Networking is required for the Network Systems Administration and Mobile Communications Technology programs.

The following diagrams demonstrate how this course fits in the programs:

## Associate Degree in Network Systems Administration:



**Associate Degree in Mobile Communications Technology:**



**NOTE:** Refer to the catalog for the state-specific course information, if applicable.

# Course Summary

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## Major Instructional Areas

1. Linux server installation and configuration
2. Command Line Interface
3. Network services
4. Installing software in Linux
5. LAN file sharing services
6. Internet services

## Detailed Topical Outline

1. Linux server installation
  - 1.1. Runlevels
  - 1.2. Un-attended installations
  - 1.3. Pre-configured users
  - 1.4. Adding users
  - 1.5. Repositories and installation customization
2. Linux CLI
  - 2.1. Common commands
  - 2.2. The Linux file system and directory structure
  - 2.3. Scripts
  - 2.4. File permissions
3. Linux network services
  - 3.1. CUPS
  - 3.2. Assigning IP addresses
  - 3.3. Troubleshooting connectivity
  - 3.4. OpenSSH server and client
  - 3.5. Sendmail and Dovecot as email services
4. Software installation
  - 4.1. Source code installation
  - 4.2. RPM packages
  - 4.3. Automating software installation with yum
  - 4.4. Repositories
  - 4.5. Methods for backing up data
5. LAN services

- 5.1. NFS
- 5.2. Samba
- 5.3. LDAP
- 5.4. Firewalls in Linux
- 6. Internet services
  - 6.1. FTP
  - 6.2. WEB
  - 6.3. DNS
  - 6.4. DHCP

## Course Objectives

This course has the following instructional objectives:

1. Plan and perform an installation of a Linux operating system.
2. Use the Command Line Interface of Linux.
3. Configure network services on a Linux server or client.
4. Install software in Linux.
5. Configure a Linux OS to share files on a LAN.
6. Configure Linux OS to utilize Internet services.

## Learning Outcomes

Upon completion of this course, students are expected to:

1. Reflect on the role of Linux in historical perspectives.
2. Describe a runlevel and use the telinit command to switch between runlevels.
3. Use a kickstart file and create a sample for deployment.
4. Install a Linux server.
5. Manage users and groups in Linux.
6. Identify the common directories and files of the Linux file structure.
7. Apply specific commands in Linux to accomplish desired tasks.
8. Manage file and directory access using file permission settings.
9. Edit text using the vi editor.
10. Write bash scripts to create complex commands and scripts.
11. Demonstrate how CUPS is used for printer management.
12. Use various tools to test and troubleshoot network connectivity.
13. Use OpenSSH as both client and server for secure remote connections.
14. Configure a Linux server to use sendmail and Dovecot for email services.

15. Differentiate among yum, rpm, and tar for managing software packages.
16. Use yum and rpm to install packages in Linux.
17. Configure Linux to use a repository.
18. Configure Linux to be a repository server.
19. Back up and restor data on Linux.
20. Configure both a client and a server to use NFS for LAN file sharing.
21. Configure both a client and a server to use Samba for LAN file sharing.
22. Explain the use of directory services on a network and configure Linux to use LDAP.
23. Use iptables to set up firewall rules in Linux.
24. Configure a Linux client to use DHCP on a network.
25. Configure a server to manage DHCP services.
26. Configure Linux to serve as a DNS server.
27. Use vsftpd to configure Linux as an FTP server.
28. Use the Apache web server for web services in Linux.

## Learning Materials and References

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### Required Resources

Textbook Package	New to this Course	Carried over from Previous Course(s)	Required for Subsequent Course(s)
Sobell, M. G. (2012). <i>A practical guide to Fedora and Red Hat Enterprise Linux</i> . (6 <sup>th</sup> ed.). Upper Saddle River, NJ: Prentice Hall.	■		
Sobell, M. G. (2012). <i>Lab manual for A Practical Guide to Fedora and Red Hat Enterprise Linux</i> . (6 <sup>th</sup> ed.). Upper Saddle River, NJ: Prentice Hall.	■		
Other Items	New to this Course	Carried over from Previous Course(s)	Required for Subsequent Course(s)
Software Fedora 15 (Media shipped in the textbook package)	■		
Software VM Web Player 3.1.4 (available on Lab the computer)	■		
Hardware ITT-provided student external USB hard drive		■	■

### Technology Requirements

#### Minimum Requirements for Computer:

- Pentium IV (min.) or equivalent processor (Macintosh or UNIX/Linux-based machines are not supported)
- 2 GB RAM (4 GB preferred)
- 20 GB free space (40 GB preferred) on master drive
- DVD-ROM drive

#### Minimum Requirements for Software:

- Windows XP (or later)
- Microsoft Office 2003 (or later)
- Internet Explorer 7.0 (or later)
- Functional email address with attachment capabilities

## Recommended Resources

### Books, Professional Journals

- *The Linux Cookbook: Tips and Techniques for Everyday Use*  
[www.dsl.org/cookbook/cookbook\\_toc.html](http://www.dsl.org/cookbook/cookbook_toc.html) (accessed 05/12/12)  
 This online book is a hands-on guide to getting things done on a Linux system, designed for the everyday user who is not necessarily a computer programmer.
- Smith, R. (2010). *Linux+ complete study guide (exams LX0-101 and LX0-102)*. Indianapolis, IN: Wiley Publishing, Co.

### ITT Tech Virtual Library (accessed via Student Portal | <https://studentportal.itt-tech.edu>) School of Information Technology>

- Professional Organizations>
  - Association of Information Technology Professionals
  - IEEE Computer Society
- Tutorial Links> Linux Tutorials
- Recommended Links: General> Linux Security.com
- Recommended Links: Online magazines and journals>
  - LINUX JOURNAL
  - NEWSFORGE: Linux/Open Source

### Other References

- Fedora 15 Install File

<http://fedoraproject.org/> (accessed 05/12/12)

Download the following file to install Fedora 15 from the Fedora Project site: Fedora-15-i386-DVD.iso

- Fedora Documentation  
[docs.fedoraproject.org](http://docs.fedoraproject.org) (accessed 05/12/12)

Many resources are available here.

On the left panel of the site, choose your preferred language at the top.

Click the version number to see manuals released specifically for that version.

Next to each manual name there is a pull down to choose the format (html, html-single, or pdf). Not all manuals are available for all released versions, and not all manuals are available in every language.

- Direct links for Fedora 15, English, html documents are:

Installation Guide:

[http://docs.fedoraproject.org/en-US/Fedora/15/html/Installation\\_Guide/sn-making-media.html#sn-making-disc-media](http://docs.fedoraproject.org/en-US/Fedora/15/html/Installation_Guide/sn-making-media.html#sn-making-disc-media) (accessed 05/12/12)

Deployment Guide:



[http://docs.fedoraproject.org/en-US/Fedora/15/html/Deployment\\_Guide/index.html](http://docs.fedoraproject.org/en-US/Fedora/15/html/Deployment_Guide/index.html) (accessed 05/12/12)

- Learning the Shell

[http://linuxcommand.org/learning\\_the\\_shell.php](http://linuxcommand.org/learning_the_shell.php) (accessed 05/12/12)

This site explains the importance of and how to learn to use the shell.

- GNU Manuals Online

[www.gnu.org/manual](http://www.gnu.org/manual) (accessed 05/12/12)

This site lists official GNU packages with links to their primary documentation, where available.

- Welcome to JustLinux

[www.justlinux.com](http://www.justlinux.com) (accessed 05/12/12)

This site is an online forum of users helping users; it includes a large help file library.

- The Linux Documentation Project

<http://tldp.org/> (accessed 05/12/12)

The Linux Documentation Project is an organization of volunteers authoring, reviewing, and managing documents about the Linux operating system.

- Linux Software equivalent to Windows software

[http://wiki.linuxquestions.org/wiki/Linux\\_software\\_equivalent\\_to\\_Windows\\_software](http://wiki.linuxquestions.org/wiki/Linux_software_equivalent_to_Windows_software)

(accessed 05/12/12)

This site lists popular Windows software in multiple categories and their equivalent Linux programs, along with links to download the Linux versions.

## Information Search

Use the following keywords to search for additional online resources that may be used for supporting your work on the course assignments:

- Fedora 15
- Linux server installation
- Linux network services
- Linux

**NOTE:** All links are subject to change without prior notice.

## Course Plan

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### Suggested Learning Approach

In this course, you will be studying individually and within a group of your peers. As you work on the course deliverables, you are encouraged to share ideas with your peers and instructor, work collaboratively on projects and team assignments, raise critical questions, and provide constructive feedback. Use the following advice to receive maximum learning benefits from your participation in this course:

DO	DON'T
<ul style="list-style-type: none"><li>▪ Do take a proactive learning approach.</li><li>▪ Do share your thoughts on critical issues and potential problem solutions.</li><li>▪ Do plan your course work in advance.</li><li>▪ Do explore a variety of learning resources in addition to the textbook.</li><li>▪ Do offer relevant examples from your experience.</li><li>▪ Do make an effort to understand different points of view.</li><li>▪ Do connect concepts explored in this course to real-life professional situations and your own experiences.</li></ul>	<ul style="list-style-type: none"><li>▪ Don't assume there is only one correct answer to a question.</li><li>▪ Don't be afraid to share your perspective on the issues analyzed in the course.</li><li>▪ Don't be negative about the points of view that are different from yours.</li><li>▪ Don't underestimate the impact of collaboration on your learning.</li><li>▪ Don't limit your course experience to reading the textbook.</li><li>▪ Don't postpone your work on the course deliverables – work on small assignment components every day.</li></ul>

## Course Outline

Unit	Unit Title	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
1	Linux Server Installation and Configuration	Assignments	Unit 1 Homework	1.5%
		Labs	Linux Installation†	1.0%
			Runlevels	1.2%
			Customization and Additional Users	1.2%
		Explore & Discuss	Roles of a Linux Server	1.0%
<i>Unit 1 Reading Assignment: Sobell, Chapter 1, Chapter 2, and Chapter 3, Chapter 9 pp. 280-282, Chapter 11 pp. 448-456, Chapter 16</i>				
2	Linux CLI Part 1	Assignments	Unit 2 Homework	1.5%
		Labs	Common Linux Commands	1.2%
			Managing Files	1.2%
			System Administration Utilities	1.2%
			Managing File and Directory Permissions	1.2%
		Explore & Discuss	Linux Filesystem	1.0%
		Quizzes	Unit 2 Quiz	2.0%
<i>Unit 2 Reading Assignment: Sobell, Chapter 5, Chapter 6, and Chapter 12</i>				
3	Linux CLI Part 2	Assignments	Unit 3 Homework	1.5%
		Labs	Editing Text Files	1.2%
			User and System Customization with Scripts	1.2%
			Managing File and Directory Permissions	1.2%
		Explore & Discuss	Bash	1.0%
		Quizzes	Unit 3 Quiz	2.0%
<i>Unit 3 Reading Assignment: Sobell, Chapter 7 pp. 226-248 and Chapter 9 pp. 301-337</i>				
4	Linux Network	Assignments	Unit 4 Homework	1.5%

Unit	Unit Title	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Services Part 1	Labs	Network Connectivity	1.2%
			Printing with CUPS	1.2%
			Managing Network Services	1.2%
		Explore & Discuss	CUPS	1.0%
		Quizzes	Unit 4 Quiz	2.0%
<i>Unit 4 Reading Assignment: Sobell, Chapter 11 pp. 482-489, Chapter 14 and Chapter 17 pp. 646-655</i>				
5	Linux Network Services Part 2	Assignments	Unit 5 Homework	1.5%
		Labs	Remote Access with OpenSSH	1.2%
			Sendmail and Dovecot	1.2%
		Explore & Discuss	Mail Services	1.0%
		Quizzes	Unit 5 Quiz	2.0%
<i>Unit 5 Reading Assignment: Sobell, Chapter 18 and Chapter 20</i>				
6	Installing Software in Linux	Assignments	Unit 6 Homework	1.5%
		Labs	Installing Additional Software	1.2%
			Troubleshooting with RPM Queries	1.2%
			Creating and Managing YUM	1.2%
			Repositories	1.2%
		Explore & Discuss	yum	1.0%
		Quizzes	Unit 6 Quiz	2.0%
<i>Unit 6 Reading Assignment: Sobell, Chapter 13 and Chapter 16</i>				
7	LAN Services Part 1	Assignments	Unit 7 Homework	1.5%
		Labs	Securing Services with iptables	1.2%
			Sharing Files with NFS	1.2%
		Explore & Discuss	Sharing Files on a Network	1.0%
		Quizzes	Unit 7 Quiz	2.0%
<i>Unit 7 Reading Assignment: Sobell, Chapter 22 and Chapter 25</i>				
8	LAN Services	Assignments	Unit 8 Homework	1.5%

Unit	Unit Title	Grading Category	Activity/Deliverable Title	Grade Allocation (% of all graded work)
	Part 2	Labs	Sharing Files with Samba	1.2%
			Lightweight Directory Access Protocol	1.2%
		Explore & Discuss	Firewall Configurations	1.0%
		Quizzes	Unit 8 Quiz	2.0%
<i>Unit 8 Reading Assignment: Sobell, Chapter 21 and Chapter 23</i>				
9	Internet Services Part 1	Assignments	Unit 9 Homework	1.5%
			Research	2%
		Labs	Configuring DHCP Services	1.2%
			Configuring DNS Services	1.2%
		Explore & Discuss	DNS Services	1.0%
Quizzes	Unit 9 Quiz	2.0%		
<i>Unit 9 Reading Assignment: Sobell, Chapter 11 p. 489-493 and Chapter 24</i>				
10	Internet Services Part 2	Assignments	Unit 10 Homework	1.5%
			Labs	Sharing Files with FTP
		Deploying a Web Server with Apache		1.2%
		Explore & Discuss	Web Services	1.0%
		Quizzes	Unit 10 Quiz	2.0%
<i>Unit 10 Reading Assignment: Sobell, Chapter 19 and Chapter 26</i>				
11	Review and Final Exam	Final Exam	Final Exam	25%

† Please retain this installed instance with all future configurations as the candidate for the ePortfolio for the program.

## Evaluation and Grading

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### Evaluation Criteria

The graded assignments will be evaluated using the following weighted categories:

Category	Weight
Assignment	17%
Lab	31%
Discussion	9%
Quiz	18%
Final Exam	25%
<b>TOTAL</b>	<b>100%</b>

### Grade Conversion

The final grades will be calculated from the percentages earned in the course, as follows:

Grade	Percentage	Credit
A	90–100%	4.0
B+	85–89%	3.5
B	80–84%	3.0
C+	75–79%	2.5
C	70–74%	2.0
D+	65–69%	1.5
D	60–64%	1.0
F	<60%	0.0

## Academic Integrity

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All students must comply with the policies that regulate all forms of academic dishonesty, or academic misconduct, including plagiarism, self-plagiarism, fabrication, deception, cheating, and sabotage. For more information on the academic honesty policies, refer to the Student Handbook and the Course Catalog.

*(End of Syllabus)*