

NITA 212:

OPEN SOURCE PLATFORM & NETWORK ADMINISTRATION

Instructor: James Banfield — Fall 2006

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Office Hours: M/W 2pm -4pm; T-TH 3pm-6:30pm (other times by appointment)

You are **REQUIRED** to enroll in the on-line portion of this course at <http://emuonline.edu>
You can request access to the site via the Emich HelpDesk

PREREQUISITE: NONE

CATALOG DESCRIPTION

Introduction to open source client/server networking, careers, and basic information security and assurance concepts. Focusing on Linux as a platform and server operating system, students learn through theory and applied work. Topics included are: file and hardware management, user account management, TCP/IP protocols, and installation of the Linux client and server. Students build and administer a basic network.

COURSE OBJECTIVES

Upon completion of the course, students will be able to:

1. Discuss the relationship of Linux and its various versions to other open source operating systems in the contemporary network environment.
2. Identify career paths open to individuals with the ability to administer open source platforms and networks.
3. Install Linux for a network client and for a network server.
4. Explain and administer the file management system and the user account management system.
5. Build a basic open source one-tier network, including configuring TCP/IP protocols necessary for this level of network.
6. Install and provide Network services for Linux environment (DHCP, DNS, Firewall (IPtables))
7. Explain how open source operating systems have addressed basic information security vulnerabilities.
8. Configure a platform and a server to meet basic security standards.

OUTLINE OF CONTENT

1. Introduction to open source operating systems
 - a. A community of developers
 - b. Significant events in the growing interest in open source systems
 - c. Varieties and versions of open source operating systems
 - d. Comparing open source to proprietary operating systems
 - e. A preview of Linux as an example open source operating system
 - f. Relationship of open source administrative skills to career options

2. Introduction to Linux
 - a. GUI and command interfaces
 - b. Overview of hardware management
 - c. Overview of the file management system
 - d. Default directories and their functions
 - e. Basics of platform installation
3. Working with the user interface and shells
4. Managing file storage and file properties
 - a. Physical and logical aspects of file storage
 - b. Commands and GUI interface to file system
 - c. File properties and file security
5. Concepts of client/server networking
 - a. Basic networking concepts
 - b. Overview of the TCP/IP protocol suite
 - c. Linux as a client operating system
 - d. Linux as a server operating system
6. The TCP/IP protocol suite
 - a. The TCP/IP suite and its origins and functions
 - b. Networked applications-- basic protocols for email, Web, chat, etc.
 - c. Protocols to establish sessions, connections, and transmissions
7. Building a basic (one-tier) Linux network
 - a. Configuring a Linux client
 - b. Configuring a Linux server
 - c. Testing the network
8. Basic security concepts
 - a. Defining vulnerabilities and controls
 - b. File security
 - c. Protocol security
 - d. Network security

STUDENT ASSIGNMENTS, EVALUATION, AND GRADING

Concept tests (25%)

Biweekly tests allow the student to demonstrate their understanding of the internals of the Linux operating system, client-server networking, information security and assurance concepts, and other course concepts as well as the terminology and commands required to work with networking in a Linux environment.

Laboratory exercises (25%)

These exercises permit students to build competence in component areas of the Linux operating system, such as file management and user account management. These exercises require use of the NITA laboratory both in and outside of class time. Exercises follow presentation of theory.

Building the network (35%)

Students will demonstrate their ability to install and configure client systems and servers and create basic networks that accomplish the goals established by the instructor. This work will require one or more teams of students. Students will solve selected basic problems built into Linux networks to demonstrate their ability to deal with both network problems and security vulnerabilities.

Network plan (15%)

As a capstone course requirement students must prepare a written plan for a Linux based basic network for an organization approved by the instructor and present the plan to the class. This may be done individually or by teams of two students.

Course text and other resources:

[Practical Guide to Red Hat® Linux®, A: Fedora™ Core and Red Hat Enterprise Linux:3/e](#)

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Mark Sobell

(Note: The available resources on Linux platform and network administration are vast, including a number of major Websites that support administrators. This bibliography primarily demonstrates that resources on the course topics are published and available from a variety of major publishers.)

Bauer, M. D. (2005). *Linux server security (2d ed.)*. O'Reilly.

Burgess, M. (2004). *Principles of network and system administration*. Hoboken, NJ: John Wiley & Sons.

Chappell, L. A. & Tittel, E. (2004). *Guide to TCP/IP*. Boston, MA: Thomson Learning/Course Technology.

Corbet, J., Rubini, A. & Kroah-Hartman, G. (). *Linux device drivers, 3d edition*. O'Reilly.

Dent, J. & Gaddis, T. (2000) *Guide to UNIX using Linux*. Boston, MA: Thomson Learning/Course Technology.

Frisch, Aileen. (2002). *Essential system administration (3d ed.)*. O'Reilly.

Garfinkle, S., Schwartz, A. & Spafford, (2003). G. *Practical Unix and Internet security (3d ed.)*.

Hunt, C. (2002). *TCP/IP network administration (3d ed.)*. O'Reilly.

Mann, S. (with Krell, M.). (2002). *Linux TCP/IP network administration*. Upper Saddle River, NJ: Prentice-Hall PTR.

Limoncelli, T. & Hogan, C. (). *The practice of system and network administration*. Addison Wesley/Pearson Education.

Negus, C. (2005). *Linux bible, 2005 edition*. Indianapolis, IN: Wiley Publishing.

Siever, E., Weber, A., & Figgins, S. (2004). *Linux in a netshell (5th ed.)*. O'Reilly & Associates.

Sobell, M. G. (2005). *A practical guide to Linux® commands, editors, and shell programming*. Upper Saddle River, NJ: Prentice-Hall PTR.

Stallings, W. (2004). *Computer networking with Internet protocols*. Upper Saddle River, NJ: Prentice-Hall.

Viega, J. (2002). *Network security with OpenSSL*. O'Reilly.