

CERTIFICATE PROGRAM IN

# UNIX/Linux System Administration

Professional training in the use and management of the UNIX operating system and its open-source counterpart, Linux



# Certificate Program in UNIX/Linux System Administration

Get thorough, up-to-date professional training.

UNIX is a multiserver, multitasking operating system (OS) and is considered both powerful and elegant. Our new certificate program offers you the information and tools to use, manage, and administer both a UNIX system and its open-source counterpart, Linux.

With the shift in the economy over the past few years, formal IT training has become increasingly important. Employees must enter the job market at higher levels, since many lower-level IT positions are being offshored and outsourced. An apparent increase in the number of companies utilizing open-source technology has created strong demand for a certificate encompassing both UNIX and Linux.

## Program Benefits

The primary purpose of this curriculum is to give you the skills, knowledge, and certification to acquire a competitive position in the high-tech industry by meeting the higher-level needs of employers.

## Who Will Benefit

- Newly assigned system administrators who need to gain the basic knowledge and skills to administer UNIX/Linux systems effectively
- End users who need to administer their own UNIX/Linux systems and wish to learn more about the systems
- Experienced but untutored system administrators who want to upgrade their UNIX/Linux skills and knowledge with formal training
- Programmers who want to understand and employ system features in their programming

## Prerequisites for Admission

There are no prerequisites for the Certificate Program in UNIX/Linux System Administration, but a bachelor's degree and a working knowledge of UNIX/Linux system administration fundamentals (such as how to use command line prompts) are recommended.

## Value of a UC Berkeley Extension Certificate

As the continuing education arm of UC Berkeley, one of the finest public research institutions in the United States, UC Berkeley Extension has an unmatched reputation for excellence. A UC Berkeley Extension certificate is widely respected and attests to successful completion of a high-caliber, in-depth course of study.

Any student is free to take individual courses rather than the complete certificate program.

## REQUIRED COURSES

### UNIX/Linux System Fundamentals

X426.1A (2 semester units in EECS-DCS)

This investigation of the UNIX operating system leads you to mastery of fundamental skills, including file management, electronic communication, creating directories, using online documentation, managing user processes, protecting files and directories, and writing shell scripts. No previous UNIX experience is required.

### UNIX/Linux System Administration Programming: Shell, C, and Perl

X426.1B (2 semester units in EECS-DCS)

This investigation of advanced features of the UNIX operating system leads you to mastery of essential skills, including manipulating data using grep, sed, awk, join, and other power utilities; programming advanced applications using the shell; customizing user accounts; creating Internet sites; and performing fundamental system operations.

### UNIX/Linux System Administration I: Essentials

X422.8 (2 semester units in EECS)

This course covers the major concepts and mechanisms of UNIX system administration. Starting with the key concepts, system administration duties, system organization, system configuration, and system start-up, the course moves on to file system architecture, device and system configuration, and process management.

### UNIX/Linux System Administration II: Networking

X420.8 (2 semester units in EECS)

This course introduces the TCP/IP Protocol suite and examines the different layers and protocols within the suite. Students experience hands-on UNIX/Linux network configuration and troubleshooting tools. Network programming concepts are introduced and reinforced through exercises. Finally, new and emerging standards as well as wide-area networking concepts are presented.

### UNIX/Linux System Administration III: Services

X444.2 (2 semester units in EECS)

In this course, students develop system administration skills related to network services by actually installing and configuring these services. Topics and exercises include sharing files using the network file system, managing the IP address space using the domain name system, mail services, using basic tools to do kernel performance, and configuring windowing systems.

### UNIX/Linux System Security

X409.9 (2 semester units in EECS)

An overview of computer security, with emphasis on UNIX, Linux, and Mac OS X. Topics include local and network threats, guidelines for maintaining a good security posture, use of encryption for securing communications and ensuring authenticity, standard UNIX commands and open-source software for maintaining security, and the use of firewalls to insulate a network from the Internet.

## CAPSTONE COURSE (REQUIRED)

### UNIX/Linux System Administration Capstone: Case Studies

X462.3

This culminating course is designed to expose students to real-world scenarios in the practice of system administration. Students gain hands-on experience building a computer from components; installing and configuring an operating system, network connection, and related services; properly securing a system; documenting system configuration and troubleshooting problems; and recovering from a disaster.



## ELECTIVE COURSES

### **UNIX/Linux Web and Database Servers**

X461.2 (2 semester units in EECS)

Designed for students who have successfully completed UNIX/Linux System Administration III, this course covers system administration skills related to Web (Apache2, Perl, PHP), Application (Tomcat), and Database (MySQL) services on UNIX/Linux-based systems.

### **FreeBSD Kernel Internals: Data Structures, Algorithms, and Performance Tuning**

X463.4 (2 semester units in EECS)

FreeBSD, like Linux, is an open-source UNIX-like operating system. Because it does not require the distribution of changes and enhancements, companies that need to control the distribution of their intellectual property increasingly are building their products using FreeBSD. This course provides a solid background in the FreeBSD kernel.

### **C Language Programming I**

X444 (2 semester units in EECS)

An introduction to the fundamental aspects of C, including elementary data types; arithmetic, logical, and bitwise operators; control-flow statements; functions; structures; pointers; program scope rules; good program design practices; and C debugging. Prerequisite: Prior experience with a high-level programming language is helpful.

### **Java: Discovering Its Power**

X436.2 (2 semester units in EECS)

This course examines Java as the *lingua franca* of advanced system programming for the Internet. You study expressions and data structures, objects and classes, inheritance, graphics programming, applets, exceptions, I/O, multithreading, and networking. You write Java programs that use the knowledge you have acquired. Prerequisites: See Web.

### **Introduction to Perl Programming**

X416.7 (1 semester unit in EECS)

Perl is a widely used, easy to learn, extremely powerful extensible language with add-on modules available for almost every kind of task. On successful completion of this course you will be able to write, debug, and understand Perl programs. Prerequisites: Familiarity with UNIX or Windows and experience with a programming language.

### **Intermediate Perl Programming**

X401 (1 semester unit in EECS)

This hands-on course is designed to maximize your ability to integrate various computer technologies using Perl. All the major intermediate features of Perl are covered, including subroutines, reports, functions, CGI, data structures, references, special variables, and Perl as Web-database integration interface (DBI). Prerequisites: See Web.

## Program Structure and Requirements

The Certificate in UNIX/Linux System Administration curriculum consists of seven required courses and at least 2 units of elective courses for a total of 16 units and 240 hours of instruction.

### Required Courses

12 semester units/180 hours

UNIX/Linux System Fundamentals X426.1A

UNIX/Linux System Administration Programming: Shell, C, and Perl X426.1B

UNIX/Linux System Administration I: Essentials X422.8

UNIX/Linux System Administration II: Networking X420.8

UNIX/Linux System Administration III: Services X444.2

UNIX/Linux System Security X409.9

### Capstone Course

2 semester units/30 hours (This course must be taken after all required courses listed above are completed.)

UNIX/Linux System Administration Capstone: Case Studies X462.3

### Elective Courses

Minimum of 2 semester units/30 hours

UNIX/Linux Web and Database Servers X461.2

FreeBSD Kernel Internals: Data Structures, Algorithms, and Performance Tuning X463.4

C Language Programming I X444

Java: Discovering Its Power X436.2

Introduction to Perl Programming X416.7

Intermediate Perl Programming X401

*"After taking seven classes in the program, I had an opportunity to try out for a Linux systems administrator position within my company. Although I did not have any real work experience as a Linux sys admin, they considered the years working as a Windows sys admin and the coursework I took at Extension and offered me the position."*

— Jaewoo Song, UNIX system administrator, SysOps, Kodak Easyshare Gallery

## How to Begin

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We recommend that you start the program with UNIX/Linux System Fundamentals x426.1A.

## Registration Procedure

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We recommend that you register for the certificate program before you begin your third course in the program. To register for the program, please print out and complete the Program Registration Form, available at [www.unex.berkeley.edu/info/cert.php](http://www.unex.berkeley.edu/info/cert.php). Mail or fax it as it indicates, and include the registration fee. (You can also complete the form and submit payment online at <https://enroll.unex.berkeley.edu/cgi-bin/cert/cert.cgi>.)

Program requirements may be updated based on new developments in the field of study; we recommend completing the program in a timely fashion.

## Completing the Program

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You are expected to complete the course requirements for the certificate within five years of taking the first course. You must notify us in writing when you have received the final grade report for your last course. After verifying successful completion of all coursework and requirements, Extension awards your certificate.

## Grading Policy

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All courses must be taken for a letter grade. A grade point average of 3.0 is required in order to earn the certificate, and each course must be completed with a grade of C or better. If you maintain a 3.5 grade point average or higher you will be awarded a Certificate with Distinction.

## Substitution of Courses

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Students may transfer up to two courses from another university, if taken within the last five years with a grade of B or better. Contact the program office for guidelines at (510) 642-4151 or [course@unex.berkeley.edu](mailto:course@unex.berkeley.edu).

## For More Information

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For additional information about the UC Berkeley Extension Certificate Program in UNIX/Linux System Administration, please call (510) 642-4151, e-mail [course@unex.berkeley.edu](mailto:course@unex.berkeley.edu), or visit [www.unex.berkeley.edu/cert/linux.html](http://www.unex.berkeley.edu/cert/linux.html).

ENROLL in individual courses at [www.unex.berkeley.edu/enroll](http://www.unex.berkeley.edu/enroll) or (510) 642-4111.

For a free UC Berkeley Extension course catalog, call 1 888 UC SMART or visit [www.unex.berkeley.edu](http://www.unex.berkeley.edu).