GAVILAN COLLEGE

5055 Santa Teresa Blvd
Gilroy, CA 95020

Course Outline

COURSE: CSIS 53   **DIVISION:** 50   **ALSO LISTED AS:**

TERM EFFECTIVE: Fall 2011   **Inactive Course**

SHORT TITLE: UNIX/LINUX NETWKG

LONG TITLE: UNIX/Linux Networking

Units	Number of Weeks	Type	Contact Hours/Week	Total Contact Hours
4	18	Lecture:	3	54
		Lab:	3	54
		Other:	0	0
		Total:	6	108

COURSE DESCRIPTION:

This class prepares students to perform the tasks and understand the strategies of UNIX/Linux network administration including DNS, various networking protocols, firewalls, proxy servers, virtual private networks, network file systems, file transfer protocols, email configuration, web servers/browsers and various network monitoring tools. This course has the option of a letter grade or pass/no pass. May be repeated two times for credit. ADVISORY: CSIS 48 and CSIS 175A

PREREQUISITES:

COREQUISITES:

CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES
        L - Standard Letter Grade
        P - Pass/No Pass

REPEATABILITY: R - Course may be repeated
Maximum of 2 times

SCHEDULE TYPES:
        02 - Lecture and/or discussion
        03 - Lecture/Laboratory
        04 - Laboratory/Studio/Activity

STUDENT LEARNING OUTCOMES:

1. Describe the function of each layer of the TCP/IP Network Model.
ILO: 1,2,3
Measure: Homework, lab, exam
2. Plan a subnet topology based upon a given set of constraints
and performance needs.
ILO: 2
Measure: Homework, lab
3. Compare and contrast the TCP and UDP protocols
ILO: 1,2,3
Measure: Homework, lab, exam
4. Configure a system for trusted access using tools for remote
access.
ILO: 2
Measure: Lab
5. Discuss the dangers and uses of packet sniffers and how to
protect against them by using the Secure Sockets Layer (SSL).
ILO: 2,3,4
Measure: Homework, lab
6. Describe the DNS name resolution process as well as reserve
lookups.
ILO: 2,3
Measure: Homework, exam
7. Describe NFS security issues.
ILO: 2,3
Measure: Homework, exam
8. Configure packet filters to restrict the flow of packets through
your system.
ILO: 2,3
Measure: Lab
9. compare and contrast GUI network monitoring tools.
ILO: 1,3,4
Measure: Lab, exam

CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS
Inactive Course: 04/25/2011
WEEK HOURS CONTENT:
1   4   Overview of Networks and Network Access.
Compare and contrast LANs with WANs in terms of their
logical structure and physical components. Outline
the basic technologies powering the Internet. Name
three network topologies and how the media is accessed.
Describe the function of each layer of the TCP/IP
Network Model. Describe the structure of a network
signal and an Ethernet frame. Define the terms client
and server with respect to a UNIX system. Define the
acronyms RFC and IEEE and describe their role in
defining protocols and setting standards. Identify
which Network Interface Cards (NIC) are compatible with

Linux, and be able to configure one to connect a host
Use ifconfig to configure a network interface.
Read chapters 1,2,3.

2   4   ARP and the Internet Layer.
Describe hardware Addressing. Describe the roles of ARP,
the ARP cache, and the arpwatch daemon in the
configuration of network interfaces. Describe the IP
addressing system, including the enhancements of IPv6.
Describe the structure of the IPv4 Datagram. Define
and describe the importance of ICMP and IGMP protocols.
Describe the roles of broadcasting, address assignment,
and multicast in the configuration of network interfaces.
Use a network sniffer to analyze network traffic.
Read chapter 4.

3-4   8   Routing and Subnets.
Plan a subnet topology based upon a given set of
constraints and performance needs. Describe the role
of routing tables in the configuration of network
interfaces. Use the Simple Routing Algorithm to
interpret a routing table. Use the route command to
manage a static routing table. Describe the steps
involved in IP multicast, as well as the situations
where this method is useful. Read Chapter 6.

5   4   Transport Protocols and Ports.
Define the term socket in terms of IP addresses and
port numbers. Describe the structure of a TCP segment
and a UDP packet. Compare and contrast the TCP and UDP
protocols. Name five tunable kernal parameters that
affect the behavior of TCP. Read Chapter 7.

6   4   The Application Layer.
Describe the roles of inetd, xinetd, and portmap with
respect to the application layer of the network.
Describe how TCP_wrappers enhance the security of a
network system. Use telnet to test daemon functionality.
Configure a system for trusted access using tools for
remote access: telnet, ssh, and the Berkeley r commands.
Describe the kibitz tools and its use in a network
environment. Read chapter 8.

7   4   Configuring WAN Connections.
Outline the useful applications of the UUCP protocol.
Connect LANs to one another and to the internet.
Identify the two main dial-up technologies, PPP and
SLIP, and their advantages and disadvantages. Configure
the various PPP interfaces and associated support files.
Describe the networking tools WvDial and its role in
a network. Connect to an ISP with PPP. Online research
assignment.

8-9   8   Virtual Private Networks and Security.

Outline the installation and implementation of Virtual Private Networks. Discuss the dangers and uses of packet sniffers and how to protect against them by using the Secure Sockets Layer (SSL). Implement a VPN using PPP as the communication link and SSH for the encryption. Online research assignment.

10-11 8   DHCP and DNS.

Identify the origins and essential concepts of the DHCP protocol. Install and set up a Linux DHCP server. Outline the elements of DNS and their interaction. Describe the DNS name resolution process as well as reverse lookups. Configure the Domain Name System to support name resolution in an enterprise network Use nsloopup to troubleshoot DNS problems. Read Chapter 10.

12   4   Network File Systems and Samba.

Describe the Network File System structure and applications. Explain how to start and stop NFS. Set up and configure the Samba daemon protocol on a Linux server. Read Chapter 10.

13   4   Configuring Mail.

List the components of an email system. Compare the mail transfer agents Sendmail, smail, and Qmail. Describe the steps involved in using POP3 and IMAP to access email on a remote server. Describe the SMTP protocol. Create global aliases and mailing lists. Describe the development and implementation of the mail and Pine programs on a network. Read online resources.

14   4   Internet Services.

Compare and contrast FTP and gFTP and describe their use on a network. Describe the development of browsers and their basic functions; compare contrast Netscape, Mozilla, and Lynx. Outline the elements that compose Apache and describe the implementation of the program. Create a virtual domain and describe the relationship between virtual domains and their services. Configure FTP for normal and anonymous access. Read online resources.

15   4   NIS and Administering TCP/IP.

Describe the importance of system startup files and the steps taken to access these files. Use NIS to centralize logging into a network. Use X Windows to distribute applications. Configure network print servers. Read online resources.

16   4   Network Address Translation and Firewalls.

Define a firewall. Configure packet filters to restrict the flow of packets through your system. Configure the kernal for ipchains. Describe ipchains to setup a firewall. Implement address translation through IP

masquerading. Outline the installation, purpose, and
implementation of firewalls. Use ipchains or iptables
to set up masquerading and IP accounting. Read chapter
14, 15.

17   4   Monitoring and Troubleshooting.
Outline common network troubleshooting techniques.
Compare and contrast GUI network monitoring tools.
Describe the network administration tool Netperf and
the services that it provides. Read chapter 9.

18   2   Review, Final.
On repeating the course, students will learn the
newest version of the software, and investigate new
network administration tools that have been developed.
ASSIGNMENTS:
See content section of course outline.

METHODS OF INSTRUCTION:
Lecture, lab project, group project.

METHODS OF EVALUATION:
The types of writing assignments required:
Written homework
Lab reports
The problem-solving assignments required:
Homework problems
Lab reports
Quizzes
Exams
The types of skill demonstrations required:
Class performance
Performance exams
The types of objective examinations used in the course:
Multiple choice
True/false
Matching items
Completion
Other category:
None
The basis for assigning students grades in the course:
Writing assignments: 5% - 10%
Problem-solving demonstrations: 10% - 70%
Skill demonstrations: 10% - 30%
Objective examinations: 10% - 30%
Other methods of evaluation: 0% -   0%

REPRESENTATIVE TEXTBOOKS:
Mann, Scott, ^uLinux TCP/IP Network Administration^s, Prentice
Hall 2002

Reading level of text: 12+ grade level. Verified by: Same text as used by Cabrillo College.

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:

CSU GE:

IGETC:

CSU TRANSFER:

Transferable CSU, effective 200330

UC TRANSFER:

Not Transferable

SUPPLEMENTAL DATA:

Basic Skills: N

Classification: I

Noncredit Category: Y

Cooperative Education:

Program Status: 1 Program Applicable

Special Class Status: N

CAN:

CAN Sequence:

CSU Crosswalk Course Department: CSIS

CSU Crosswalk Course Number: 53

Prior to College Level: Y

Non Credit Enhanced Funding: N

Funding Agency Code: Y

In-Service: N

Occupational Course: B

Maximum Hours:

Minimum Hours:

Course Control Number: CCC000435833

Sports/Physical Education Course: N

Taxonomy of Program: 070100