Las Positas CurricUNET

LAS POSITAS COLLEGE

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Course Outline for CIS 66

NETWORKING FUNDAMENTALS

Effective: Fall 2020

I. CATALOG DESCRIPTION:
CIS 66 — NETWORKING FUNDAMENTALS — 3.00 units

This course provides an introduction to computer networking fundamentals skills needed to meet the industry demand for entry-level Network Technicians. Topics include: Ethernet network fundamentals, Local Area Networks (LANs), and Wide Area Networks (WAN) technologies, the Open Systems Interconnection (OSI) model, wiring implementations, network adapters and connectivity devices, IPv4/IPv6 addressing, Voice over IP (VoIP), and wireless standards. Tools to help prevent cyber attacks with IDS (Intrusion Detection Systems), authentication, and encryption are demonstrated. Student labs include: configuration of a SOHO (Small Office/Home Office), a firewall, a virtual private network (VPN), a switch, and a router and documenting a networking using professional drawing software. The responsibilities of an ICT (Information and Communications Technology) professional will be introduced. This course prepares students for the CompTIA Network+ Certification Exam. This professional certification verifies the student has the knowledge equivalent to that of an ICT technician with about 12 months of hands-on experience. Students who have completed or are enrolled in CNT 52 may not receive credit.

3.00 Units Lecture

Strongly Recommended
CIS 50 - Introduction to Computing Information Technology
with a minimum grade of C

Grading Methods:
Letter or P/NP

Discipline:
- Computer Information Systems or
- Computer Service Technology

	MIN
Lecture Hours:	54.00
Expected Outside of Class Hours:	108.00
No Unit Value Lab	18.00
Total Hours:	180.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering this course, it is strongly recommended that the student should be able to:

A. CIS50
1. Solve common business problems using appropriate Information Technology applications and systems;
2. Demonstrate familiarity with the computing environment, including the hardware, operating system, the user interface, and applications;
3. Demonstrate the possible solution(s) for simple business applications by applying productivity tools including, word processing, spreadsheets, databases, and presentation software;
4. Investigate current issues in computer environments such as security, society and business ethics over the use of computer data, and organization of data processing resources within the organization; and
5. Describe the capabilities, use, and characteristics of programming languages in a computer environment.

IV. MEASURABLE OBJECTIVES:
Upon completion of this course, the student should be able to:

A. List and explain the layers of the OSI model and the TCP/IP Stack and describe the roles of protocol layers in data networks;
B. Describe and differentiate the devices, protocols, and services used to support communications in data networks and the Internet;
C. Calculate both IPv4 and IP6 subnets, and segment a large network into smaller parts;
D. Evaluate the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments;

E. Design and assemble an Ethernet network and a wireless network, including routers, switches, and cables;
F. Explain Ethernet topologies, and relevant IEEE hardware and software specifications;
G. Describe the major functions of LAN hardware protocols such as Ethernet; and WAN protocols such as T-series, DSL, ATM, and Frame Relay;
H. Build a router and switch topology; and configure the devices to communicate with computers;
I. Compose CISCO command-line interface (CLI) commands to perform basic router and switch configuration;
J. Identify the responsibilities of a LAN system administrator;
K. Draw typical network diagrams, using software tools such as Microsoft Visio;
L. Monitor the network activity using monitoring tools to view packets and analyze traffic.

V. CONTENT:
A. OSI (Open Systems Interconnection) and TCP/IP (Transmission Control Protocol/Internet Protocol) layered models
B. IP addressing (IPv4 and IPv6)
C. Routing and switching
D. Functions of common networking protocols
E. DNS (Domain Name System)
F. Network troubleshooting methodology
G. Installation and configuration of routers and switches for a given scenario
   Installation and configuration of a wireless network for a given scenario
   DHCP (Dynamic Host Configuration Protocol)
H. Planning and implementation of a basic SOHO (Small Office/Home Office) network for a given set of requirements
I. Standard media types (for example: Fiber, Copper), associated properties, standard connector types
J. Wireless standards
K. WAN (Wide Area Networks) technology types and properties
   Network topologies (for example: Ring, Star, Client-server)
L. LAN (Local Area Networks) technology types and properties
M. Hardware and software tools to troubleshoot connectivity issues
N. Network monitoring resources to analyze traffic
O. Network performance optimization
P. Wireless Security Measures
Q. Network Access Security Methods
R. User authentication Methods
S. Common threats, vulnerabilities, and mitigation techniques
T. Installation and configuration of a basic firewall
U. Network Security appliances and methods

VI. METHODS OF INSTRUCTION:
A. **Audio-visual Activity** - This course comes with closed-captioned videos that explain the main topics.
B. **Discussion** - Group discussions relevant to course topics are encouraged on the school course system Canvas, and in the class room. Current IT news may stimulate students' interest in pursuing careers, and are welcome in the forum and in class.
C. **Lab** - Students build and configure a wireless network. They identify and configure the settings for correct connectivity using IPv4 and IPv6. Students document a typical network with professional drawing software.
D. **Classroom Activity** - Student labs include configuration of a network, a firewall, a virtual private network (VPN), a switch, and a router.
E. **Demonstration** - Tools to help prevent cyber attacks with IDS (Intrusion Detection Systems), authentication, and encryption are demonstrated.
F. **Lecture** - Weekly lectures reflect the chapter contents.

VII. TYPICAL ASSIGNMENTS:
A. Identify and explain packets using WireShark network analyzer.
B. Explain the protocols used and the main fields inside the frames.
C. Design a home or small business network using Microsoft Visio drawing software. Build same network on Network Simulator, and test for connectivity between end devices.
D. Using a Wi-Fi access point simulator, or actual hardware device, ensure the security features have been enabled for maximum protection and privacy.

VIII. EVALUATION:
Methods/Frequency

A. Exams/Tests
   One midterm and one final exam
B. Quizzes
   One weekly quiz
C. Projects
   One to two
D. Simulation
   Weekly
E. Group Projects
   One to two
F. Class Participation
   Weekly
G. Lab Activities
   Weekly

IX. TYPICAL TEXTS:
1. Meyers, Mike. *CompTIA Network+ Certification All-in-One Exam Guide, Seventh Edition (Exam N10-007).* 7th ed., McGraw-Hill Osborne Media, 2018.
2. Dean, Tamara. *Network+ Guide to Networks.* 8th ed., Cengage Learning, 2018.
3. Lammle, Todd. *CompTIA Network+ Deluxe Study Guide: Exam N10-007.* 4 ed., Sybex, 2018.
4. LabSim Network Pro, Network+ Certification. LabSim Educational Solutions, (2019/Online Access).

X. OTHER MATERIALS REQUIRED OF STUDENTS:
A. Portable storage device: flash drives, or external USB disk
B. Print card