Common Course Outline
DCOM 235
Computer Systems Operation, Maintenance and Troubleshooting
4 Semester Hours

The Community College of Baltimore County

Description

DCOM 235 – 4 credits - Computer Systems Operation, Maintenance and Troubleshooting deals with the interrelationships between hardware and software at the system level. System components, such as video adapters, mass storage interfaces and input/output ports, are introduced and supported through “hands-on” lab exercises. Diagnostic software is used to identify and isolate faulty devices and sub-systems.

This is the second of a two course sequence designed to help prepare the student for the CompTIA A+ certification examinations.

4 credits; 4 lecture hours per week

Prerequisite: DCOM 141 or consent of the program coordinator

Overall Course Objectives

Upon completion of this course the student will be able to:

1. identify the basic components of a microcomputer;
2. distinguish between the popular Central Processing Unit (CPU) chips;
3. identify available IRQs, DMAs, and I/O addresses and procedures for configuring them for device installation;
4. demonstrate basic procedures for disk management;
5. describe and demonstrate proper procedures for installing and configuring peripheral devices;
6. identify hardware methods of increasing system performance, procedures for replacing basic subsystem components, unique components, and when to use them;
7. diagnose common symptoms and problems associated with each component in the PC and how to troubleshoot and isolate the problems;
8. describe the fundamental workings of multimedia technology;
9. discuss the basics of how computers communicate with each other;
10. demonstrate basic networking concepts; and
11. identify the major components of a printer.
Major Topics

I. Managing Memory
   1. RAM on the Motherboard
      a. Static RAM Technologies
      b. Dynamic RAM Technologies
      c. Error Checking and Parity
      d. CAS Latency and RAS Latency
      e. Memory Speeds
   2. Upgrading Memory
      a. What to Look for When Buying
      b. Memory Chips and Modules
      c. How Much and What Kind of Memory to Buy
      d. Reading Ads About Memory Modules
      e. Installing Memory
   3. Operating Systems Memory Management
   4. Hands-on Lab: Managing Memory

II. Floppy Drives
   1. How Floppy Drives Work
      a. How Data Is Physically Stored on a Floppy Disk
      b. How Data Is Logically Stored on a Floppy Disk
      c. The Formatting Process for a Floppy Disk
   2. Exchanging and Supporting Floppy
      a. Replacing a Floppy Drive
      b. Adding a New Drive
      c. When a Floppy Disk Drive Doesn't Work
   3. Some Common Error Messages and Their Meanings
   4. Hands-on Lab: Floppy Drives

III. Understanding and Installing Hard Drives
   1. Hard Drive Technology
      a. Types of Hard Drive Interfaces
      b. How Hard Drives Work
   2. Communicating with the Hard Drive Controller
      a. Calculating Drive Capacity on Older Drives
      b. Hard Drive Size Limitations
   3. How a Hard Drive is Logically Organized to Hold Data
   4. Installing a Hard Drive
      a. Prepare for Installation
      b. Set Jumpers
      c. Mount the Drive in the Bay
      d. Use CMOS Setup to Change
      e. Hard Drive Settings
      f. Setup for Large-Capacity Hard Drives
      g. Use Fdisk to Partition a Drive
      h. Format Each Logical Drive
5. Troubleshooting Hard Drive Installations
6. **Hands-on Lab:** Understanding and Installing Hard Drives

IV. Optimizing and Protecting Hard Drives
1. Managing Hard Drives
   a. Defrag and Windows Disk Defragmenter
   b. Using ScanDisk to Correct Cross-Linked and Lost Clusters
   c. Disk Cleanup
   d. Disk Compression
   e. Disk Caching
   f. Making Backups
2. Viruses and Other Computer Infestations
   a. Understanding Computer Infestations
   b. Protecting Against Computer Infestations
3. Troubleshooting Hard Drives
   a. Resolving Common Hard Drive Problems
   b. Getting Technical Support
4. **Hands-on Lab:** Optimizing and Protecting Hard Drives

V. Supporting I/O Devices
1. Basic Principles of Peripheral Installations
2. Using Ports and Expansion Slots for Add-On Devices
   a. Using Serial Ports
   b. Using Parallel Ports
   c. Using USB Ports
   d. Using IEEE 1394 Ports
3. Installing an Expansion Card in an Expansion Slot
   a. Using PCI Expansion Slots
   b. Using ISA Expansion Slots
4. Keyboards
   a. Keyboard Connectors
   b. Installing Keyboards
   c. Troubleshooting Keyboards
5. Pointing Devices
   a. Cleaning the Mouse
   b. Touch Screens
   c. Other Pointing Devices
   d. Troubleshooting a Mouse
6. Computer Video
   a. Monitors
   b. Video Cards
7. Troubleshooting Video Problems
8. **Hands-on Lab:** Supporting I/O Devices

VI. Multimedia Devices and Mass Storage
1. Multimedia on a PC
a. CPU Technologies for Multimedia
b. Sound Cards
c. Digital Cameras
d. MP3 Players
e. Video Capture Card

2. Optical Storage Technology
   a. CD
   b. CD-R and CD-RW, DVD

3. Hardware Used for Backups and Fault Tolerance
   a. Tape Drives
   b. Removable Drives
   c. Dynamic Volumes, and RAID

4. Troubleshooting Guidelines

5. Problems with CD, CD-RW, DVD, or DVD-RW Installation

6. Troubleshooting Sound Problems

7. Troubleshooting Tape Drives

8. Hands-on Lab: Multimedia Devices and Mass Storage

VII. Supporting Modems  All About Modems
1. How Modems Are Rated
2. Installing and Configuring a Modem
   Troubleshooting Guidelines for Modems
3. Hands-on Lab: Supporting Modems

VIII. PCs on a Network
1. Physical Network Architectures
   a. Ethernet
   b. Wireless LANs
   c. Token Ring and FDDI
   d. How NICs Work
   e. Segmenting a Network
2. Windows on a Network
   a. Addressing on a Network
   b. How Computers Find Each Other on a LAN
3. Installing a Network Card and Connecting to a Network
   a. Installing a NIC Using Windows2000/XP
   b. Installing a NIC Using Windows 9x
   c. Installing a Wireless NIC
4. Using Resources on the Network
   a. Sharing Files, Folders, and Applications
   b. Network Drive Maps
5. Troubleshooting a Network Connection
6. Connecting Networks
   a. Routers
   b. Bandwidth Technologies
7. Hands-on Lab: PCs on a Network
IX. PCs on the Internet

1. The TCP/IP Suite of Protocols
   a. Using IP and Port Addresses to Identify Services
   b. TCP/IP Protocol Layers
   c. TCP/IP Utilities

2. Connecting to the Internet
   a. Dial-up Networking
   b. DSL and Cable Modem Connections
   c. Sharing Internet Connections

3. Supporting Internet Clients
   a. Supporting Web Browsers
   b. Supporting Email
   c. Supporting FTP

4. **Hands-on Lab:** PCs on the Internet

X. Notebooks, Tablet PCs, and PDAs

1. Notebook Computers
   a. Windows Notebook Features
   b. Caring for Notebooks
   c. Power Management
   d. Connecting Peripheral Devices to Notebooks
   e. Upgrading Memory
   f. Other Field Replaceable Units for Notebooks
   g. Online Resources for Troubleshooting Notebooks
   h. Tablet PCs

2. PDAs
   a. Battery Life on a PDA
   b. Applications on a PDA
   c. Connecting a PDA to a PC
   d. PDA Manufacturers and Operating Systems

3. **Hands-on Lab:** Notebooks, Tablet PCs, and PDAs

XI. Supporting Printers

1. How Printers Work
   a. Laser Printers
   b. Inkjet Printers
   c. Dot-Matrix Printers
   d. Thermal Printers and Solid Ink Printers

2. Installing and Sharing a Printer
   a. Installing a Local Printer
   b. Sharing a Printer with Others in a Workgroup

3. Troubleshooting Guidelines for Printers
   a. How Windows Handles Print Jobs
   b. Printer Maintenance
   c. General Printer Troubleshooting
   d. Problems Printing from Windows
1. Troubleshooting Networked Printers

4. Hands-on Lab: Supporting Printers

XII. All About SCSI
1. SCSI Basics
   a. The SCSI Subsystem
   b. Host Adapters
   c. SCSI Device Drivers
   d. Variations in SCSI
2. Comparing IDE and SCSI
3. Installing SCSI Devices
4. Setting Device IDs
   a. During Installation
   b. Installing a SCSI Hard Drive
5. Troubleshooting SCSI Devices

Hands-on Lab: All About SCSI

XIII. Purchasing a PC or Building Your Own
1. Selecting a Personal Computer to Meet Your Needs
2. Preparing to Build Your Own PC
   a. Getting Ready for Assembly: Selecting Parts
   b. Getting Ready for Assembly: Final Preparations
3. Building a Personal Computer,
4. Step by Step
   a. Overview of the Assembly Process
   b. Step 1: Verify That You Have All the Parts
   c. Step 2: Prepare the Computer's Case
   d. Step 3: Install Drives
   e. Step 4: Set Jumpers or Switches on the Motherboard
   f. Step 5: Install the CPU and CPU Fan
   g. Step 6: Install RAM on the Motherboard
   h. Step 7: Install the Motherboard and Attach Cabling
   i. Step 8: Install the Video Card
   j. Step 9: Install the Modem Card
   k. Step 10: Plug In the Computer and Attach External Devices
   l. Step 11: Boot the Computer, Check Settings, and Verify Operation
   m. Step 12: Install Peripheral Devices and Applications
5. Hands-on Lab: Purchasing a PC or Building Your Own

Course Requirements

Grading: Grading procedures will be determined by the individual faculty member and provided the first week of class; and will include the following: a minimum of five (5) major graded assignments (possibly including hourly exams, a midterm exam and/or lab projects) plus a final examination.
Other Course Information

This course is for CCBC’s A+ Certificate program. This course, along with DCOM 141, helps prepare students for the A+ certification offered by the Computer Industry Association (CompTIA). This course is taught in a combination of lecture and hands-on computer laboratory format.