

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;
1. distinguish between the popular Central Processing Unit (CPU) chips;
2. identify available IRQs, DMAs, and I/O addresses and procedures for configuring them for device installation;
3. demonstrate basic procedures for disk management;
4. describe and demonstrate proper procedures for installing and configuring peripheral devices;
5. identify hardware methods of increasing system performance, procedures for replacing basic subsystem components, unique components, and when to use them;
6. diagnose common symptoms and problems associated with each component in the PC and how to troubleshoot and isolate the problems;
7. describe the fundamental workings of multimedia technology;
8. discuss the basics of how computers communicate with each other;
9. demonstrate basic networking concepts; and
10. 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. MP3Players
- 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 Fault Tolerance,
 - 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

- e. 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\ 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 a 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.