

Mercer County Community College

Division of Business and Technology

NET 111

Basic Computer Hardware

COURSE DESCRIPTION:

A study of the characteristics of the devices commonly found within a computer center and a modern office. The lab offers the student experience in microcomputer and mainframe I/O handling procedures and peripheral equipment operations.

TEXTS: **Title:** Modern Computer Center Operations
 Author: L. Hoffman
 Publisher: MHP Communications Ltd.
 Edition: Latest

MATERIALS: Flowcharting Template
 3.5" Diskette - Blank

Recommended Supplementary Texts from the Library:

Title: The Winn L. Rosch Hardware Bible
Author: Winn L. Rosch

Title: How Computers Work
Author: Ron White

Title: Understanding Computers
Author: Shedroff, Hutto, and from

Title: Troubleshooting, Maintaining, & Repairing PCs
Author: Bigelow (Millennium Edition)

Title: IBM Mainframes
Author: N.S. Prasad

Title: Upgrading And Repairing PCs
Author: Scott Mueller (Eleventh Edition)

Title: Computer Desktop Encyclopedia
Publisher: The Computer Language Co.

Prerequisites: Eng 025, Eng 020 and Mat 020 Or Equivalent

Credits: 4

Class Hours: 3

Lab Hours: 3

**Food and Drink are Strictly Prohibited in Classrooms as per Health and Safety Laws.
Students may not bring in chemicals of any kind without the Appropriate MSD sheets.**

Course Coordinator: W. Maddox

Latest Review: Spring 2004

I. GENERAL OBJECTIVES

The course is designed to provide the student with a sound background in the fundamentals of computer hardware and hardware operations. The relationship of hardware, software and personnel is described and emphasized. The course provides "hands on" experience in the operation of mainframe computer peripheral equipment, microcomputer systems, and related equipment during lab periods.

II. LABORATORY

Students will be given a list of the objectives for each laboratory period and a description of each laboratory exercise.

III. LABORATORY EVALUATION

Each student's performance of a laboratory exercise will be evaluated by the Laboratory Instructor.

IV. TESTS

There will be a maximum of six tests. Some tests might be given in the Testing Center (LA215) and some in the classroom. There will be no makeup or re-testing. Depending on the number of tests given, one or more of the lowest tests may be dropped. The final will be counted as a test.

V. QUIZZES/HOMEWORK

Quizzes and homework will be given throughout the course and usually unannounced. There is no makeup of quizzes. Depending on the number of quizzes, one or more of the lowest quizzes may be dropped.

VI. FINAL GRADE

Tests/Final	60%	
Laboratory Performance	25%	
Quizzes and/or Homework		10%
Drills	05%	

UNIT I

- WEEKS:** One through Four
- TOPIC:** Introduction to Data Processing / Data Entry / Input Devices
- READING:** Hoffman: Chapter Three and use of the Index.
- LABORATORY :** As Specified in The Laboratory Projects Manual
- OBJECTIVES:**

Students will be able to:

1. Define, identify the definitions or functions of:

Data	Record	Mouse
Information Peripheral Equipment	Digitizer	Optical Scanner
Check Digit	Numeric Key Pad	Scanner
Auxiliary Equipment	ASCII	Touch Screen
File	EBCDIC	Mark Reader
Field	DIN Connector	BYTE
Batch Processing	OCR Device	BIT
Real Time Processing	GIGO	Voice Input Device
Record Layout	Turnaround Document	CPU
Source Document	Prompt	Bit Serial
Buffer	Light Pen	Mini-DIN Connector
Cursor	Editing	USB Port
Volatile Memory	Online Data Entry	Serial Port
Data Integrity	Keyboard	Dbxx Connector
Data Processing	Sheet Reader	
Computer System	Character Reader	
Hardware	Diskette	
RAM	Joystick	
ROM	Monitor	
Software	MICR	
Firmware	Optical Mice	
Keyboard Scan Codes Shift Key	Bar Code Reader	
Alt Key	UPC	
Ctrl Key	Function Keys	
Program		

Nonvolatile Memory

Pointing Device
Trackball

2. List examples of:
Input Devices, Output Devices, Storage Devices, Processing Devices, and Turnaround Documents.
3. Identify examples of:
Decentralized Data Entry.
Centralized Data Entry.
4. Identify:
Magnetic tape Diskette
5. State the name of each computer system in MCCC's main computer room.
6. State two reasons for the elevated floor in MCCC's main computer room.
7. Given a record description and/or printed dump of a file:
Draw a record layout.
Identify each field in a record.
8. Demonstrate the ability to properly:
 - Power on and make a microcomputer system ready for work.
 - Determine if operating system has the correct date and time.
 - Execute a specified batch (.bat) file, or a specified program, on the microcomputer system.
 - Obtain a hard copy of the microcomputer system's directory
 - Use a program to create a data file on a diskette.
 - Visually edit and identify any errors in a data file.
 - Use a program to make changes to a data file.
 - Execute and use a program (CO111DRL) to develop the student's pre-console operation skill.
 - Execute and use a program (CO111PRO) to measure their progress in developing his/her pre-console operation skill.
 - Format and label a diskette.
 - Display the directory of a diskette and identify the names of files, their size, and the date and time of the file's creation.
9. Contrast:
Online batch data entry versus real-time data entry.
Implications of a well designed source document versus a poorly designed source document.
The IBM Enhanced Keyboard with an Ergonomic Keyboard.

10. Describe:
The IBM Enhanced Keyboard.
The IBM AT Keyboard.
Compatible Keyboards.
Three Types of Ergonomic Keyboards.
How any keyboard works.
Keyboard feedback.
A Mouse and how it works.
A Touch Screen and how it works.
A Light Pen and how it works.
11. State why keyboard Scan codes are used.
12. Given a line drawing of a computer mouse identify by name, and function, its components.
13. Given a problem condition with a keyboard describe possible causes and corrective action needed.
14. Given a problem condition with a mouse, or a trackball, describe possible causes and corrective action needed.
15. Given a classification of a mouse or trackball, draw and identify the components.
16. Given a description of a user's work environment, state the procedure to replace their mouse.
17. Given a description of a user's work environment, state the procedure to replace their keyboard.

UNIT II

WEEKS: Five through Eight

TOPIC: Printers, Monitors, and Display Units

READINGS: Hoffman: Chapter Seven and from the Index

LABORATORY: As specified in the Laboratory Projects Manual

OBJECTIVES:

Students will be able to:

1. Define, identify the definitions or functions of:

Spooling	Parallel Interface	Top of Form Key
Control Unit	Fonts	Print One Line Key
Firmware	ESCON Channel	Form Feed Key
FCB	Spooling	Line Feed Key
Parity Check	Channel	Stacker up Key
Parity Bit	Channel Processor	Stacker down Key
PIXEL	Spooling	Dot Matrix
BIT Mapped	Power	Technology
Buffer	DPI	Print Head Carriage
Plug-Compatible	PostScript printers	Solenoid
Online	PCL	Photosensitive Drum
Offline	Local Terminal Remote	Toner
Print Hammer Unit	Terminal	Primary Corona
Impact Printer	Intelligent Terminal	Transfer Corona
Stacker	Dumb Terminal	Fusing Station
Ribbon	VDT	Bonding Station
Forms Tractors	Forms Compartment	Cleaning Station
Ribbon Shield Assembly	Print Hammer Unit	Erase Station
Horizontal Adjustment Knob	Print Hammers	EP Printer
Forms Thickness Lever	Print Band	Monitor
Video Display Terminal	Print Band Tension Lever	CRT
Parallel Channel	Print Band Cover	Cathode Ray Tube
Multiplexer Channel	Interlaced	Shadow Mask
6262 Attention Light	Non-interlaced	Refresh Rate
EBCDIC	Attention Light	Vertical Scan Rate
ASCII	Operator Panel	LCD
Operating System Supervisor Program	Platen Bar	Slot Mask
Control Program	Platen Roller	Triad
Friction Feed	Print Line Indicator	Monitor's Resolution
Tractor Feed	Print Position Indicator	
Parallel Port	Forms Present Sensor	
Bidirectional Port	Print Band Brush	

2. List examples of:
 - User programs.
 - Storage devices for the print queue.
3. List the classifications and types of:
 - Channels
 - Printers
4. Describe the Paper Path in the IBM 6262 Printer.
5. List:
 - Responsibilities of a printer operator.
 - Considerations to be made before considering the purchase of a new printer.
 - Considerations to be made when selecting a printer.
 - Types of line printers.
 - Types of non-impact printers.
 - Characteristics of a high capacity page printer sub-system.
6. Contrast:
 - Selector channel versus multiplexer channel.
 - Parallel channel versus ESCON channel.
 - ESCON versus FICON channel
 - Character printer versus a dot-matrix printer.
 - Impact versus non-impact printers.
7. Given a drawing of the IBM 6262 correctly identify the specified components.
8. Given any eight-digit binary number convert it to a two-digit hexadecimal number.
9. Given any two-digit hexadecimal number convert it to an eight-digit binary number.
10. Given the binary contents of an eight-bit byte use an ASCII chart to write the character stored in the byte.
11. Given the location of an MCCC printer from our laboratory experiences correctly classify same.
12. Given a line drawing of a laser printer, correctly identify the major components/stations, and the function of the component/station.
13. Describe how a dot matrix serial impact printer works.
14. Describe how a character line printer works.
15. Describe how a dot matrix impact line printer works.
16. Compare any two given printers relative to advantages and disadvantages.

17. Given a problem condition with a laser printer, specify the possible cause and corrective action needed.
18. Given a problem condition with an ink jet printer, specify the possible cause and corrective action needed.
19. Given an eight-bit byte with its parity bit state if it is an even or odd parity system.
20. Given an eight-bit byte indicate the correct parity bit for both an even and an odd parity system.
21. Describe how a laser printer works.
22. Describe how an ink jet printer works.
23. Create a sketch of a laser printer indicating its components.
24. Describe how a color CRT works.
25. Given an abbreviated ASCII chart and the binary contents of a series of bytes state the characters stored in those bytes.

UNIT III

WEEKS: Nine through Eleven

TOPIC: Magnetic Tape

READINGS: Hoffman – Pages referenced by the Index, Chapter Five, and Chapter Seven

LABORATORY: As specified in the Laboratory Projects Manual

OBJECTIVES:

Students will be able to:

1. Define, identify the definitions or functions of:

Creation Date	Recording Tracks	Expiration Date
ANSI	Volume Record	End of Tape Marker
Label Record	EOT	Interblock Gap
IBG	Tape Mark	SAM
Multivolume File	System Flowchart Symbols	Blocking Factor
Tape Initialization	External Tape Label	
File Protect Ring	Multi-file Volume	Systems Flowchart
Physical Record	Track Density	Physical Record
Trailer Label	Logical Record	Dual Density
Blocking	BPI	bpi
Scratch Tape	BOT/EOT Sensor	Transfer Rate
Rewind Time	Logical Unit	Helical Scan
DAT Tape Cartridge	QIC Tape Cartridge	DLT Cartridge
Logical Unit Address	Sequential Retrieval	Volume Serial Number
Read/Write Head	Random Retrieval	File-id
Tape Leader Block		

2. List:

Possible magnetic tape applications.
Most common uses for magnetic tape in most data centers
Rules for tape handling.
Responsibilities of the tape unit operator.

3. Describe or identify the description of:

Physical characteristics of standard magnetic tape.
The external tape file label on.
Open reel tape format.

4. Contrast:

Start/stop recording versus streaming.
Open reel tape versus cartridge tape.
Parallel versus serial recording.

5. Given an Open Reel tape correctly state if it is file tape or a scratch tape.

6. Given a block drawing of magnetic tape records correctly identify the volume, header, trailer, and data records.
7. Contrast the characteristics and use of magnetic reel tape with magnetic cartridge tape.
8. Given a line drawing of the IBM 3490E Tape Sub-system, correctly identify the major components by name and function.
9. Sketch a 3490 tape cartridge and identify its components.
10. Given a mounted 3490 tape cartridge, state the procedure to determine it is a scratch or file tape.
11. State exactly how to correctly carry a reel of tape.
12. State how the operating system knows a tape is a file tape or a scratch tape without use of a Tape Management System.
13. Given an abbreviated EBCDIC chart and the binary contents of a series of bytes, state the characters stored in those bytes.

UNIT IV

WEEKS: Twelve through Fifteen

TOPIC: Direct Access Storage Devices

READING: Hoffman – Pages Referenced by the Index and as specified by Instructor.

LABORATORY: As specified in the Laboratory Projects Manual

OBJECTIVES:

Students will be able to:

1. Define; identify the definitions or functions of:

DASD	Random File
Track	Indexed Sequential File
Cylinder	RAID
Diskette	Redundant Array of Independent Disks
Optical Disk	Diskette Shutter
VTOC	CD-R
Laser Disk	CD-RW
ISAM	Diskette Jacket
SAM	Write Protect Notch
VSAM	Write Protect Lock
DAM	CD-ROM
Record Key	FAT
Head Crash	File Allocation
Disk Mirroring	Redundancy
Sector	Disk Caching
Relative Record Address	Winchester Technology
WORM	Disk Mirroring
Sector	Seek Time
Hard Disk Drive	Access Time
Read/Write Head	Rotational Delay
Diskette Sleeve	Preventive Maintenance
Table	DVD
Cluster	
Sequential File	

2. List:
 - Five types of direct access storage devices.
 - Four advantages of direct access files.
 - Three types of data organization that might be found on a direct access device.
 - Five rules for proper diskette handling.

3. Contrast:
 - A Diskette Drive with a Hard Disk Drive.
 - The Physical Characteristics of Magnetic Disks with Optical Disks (CDS and DVDs) media.
 - The Physical Format of Magnetic Disks with Optical Disks (CDS and DVDs).

4. Describe:
 - Characteristics of a Magnetic Disk.
 - Characteristics of a Magnetic Diskette.
 - Characteristics of a Compact Disk.
 - Characteristics of a Digital Versatile Disk.
 - The Cylinder Technique Used in Magnetic Disk Drives.

5. List the advantages and disadvantages of any file type - sequential, random, and indexed.

6. List five reasons to backup disk files.

7. Given the description of a disk, list the cylinder addresses for a specified number of cylinders.

8. Given the description of a disk, list the cylinder and head addresses for a specified group of cylinders.

9. Discuss why disk subsystems are currently being designed with built-in redundancy.

10. Sketch a diskette and identify its components by name and function.

11. State the procedure to remove a diskette with a bent shutter.

12. State the procedure to recover files from a diskette with a bent shutter.

