



COURSE OUTLINE

NET 102

Introduction to PC Hardware and Software

Course Number

Course Title

3

2/3

Credits

Lecture/Laboratory Hours

Catalog description:

Students learn to install, configure, diagnose, and troubleshoot microcomputer hardware components and operating systems. Includes an introduction to local area networks, bus structures implemented on PCs, the identification and installation of memory, the installation and configuration of several different operating systems, and the various preventative maintenance issues associated with hardware and software.

Prerequisite:

None.

Required texts/other materials:

Reference Division Booklist

Last revised:

Spring 2019

Course coordinator:

Jeff Weichert

Library resources:

In addition to the required textbook, students will be required to make use of a variety of technical Web sites throughout the semester.

Learning Center resources:

Some tutoring is available through the Learning Center.

Introduction to the course

This is an overview course of how microcomputers function, focusing on both their hardware and software. You will learn how to install and configure all types of internal and external computer hardware components and popular operating systems and software. Troubleshooting and preventive maintenance for both computer components and software is covered. The course includes a survey of PC operating systems and their interaction with application(s) programs: including installation, upgrading, maintenance, security, and network connectivity. Contrasts are made between the latest Windows, Linux, and Mac operating systems.

Course goals

The student will be able to:

- Identify, at a basic level, the names, purposes, and characteristics, of system modules, and recognize the modules by sight or definition.
- Identify, at a basic level, the major desktop components and interfaces, and their functions, and differentiate the characteristics of the various desktop operating systems.
- Identify, at a basic level, the procedures for adding and removing field-replaceable modules for desktop systems and portable systems and, given a replacement scenario, choose the appropriate sequences.
- Identify, at a basic level, the names, locations, purposes, and contents of major system files.
- Identify, at a basic level, typical IRQs, DMAs, and I/O addresses, and procedures for altering those settings, when installing and configuring devices, and choose the appropriate installation or configuration steps in a given scenario.
- Demonstrate, at a basic level, the ability to use command line functions and utilities to manage the operating system, including proper syntax and switches.
- Identify, at a basic level, the names, and performance characteristics, of standardized/common peripheral ports, associated cabling, and their connectors, and recognize ports, cabling, and connectors by sight.
- Identify, at a basic level, the concepts and procedures for creating, viewing, and managing disks, directories, and files, including procedures for changing file attributes and the ramifications of those changes (including security issues).

- Identify, at a basic level, the proper procedures for installing and configuring common IDE and SCSI devices and peripheral devices, and choose the appropriate installation or configuration sequences in given scenarios, as well as recognize the associated cables.
- Identify, at a basic level, the major operating system utilities, their purpose, location, and available switches.
- Identify, at a basic level, the procedures to optimize PC operations in specific situations, and predict the effects of specific procedures under given scenarios.
- Identify, at a basic level, the procedures involved in installing the various desktop operating systems and bringing the operating system to a basic operational level.
- Determine, at a basic level, the issues that must be considered when upgrading a PC, and in a given scenario, determine when and how to upgrade system components.
- Identify, at a basic level, the steps to perform an operating system upgrades, and given an upgrade scenario, choose the appropriate next steps.
- Recognize, at a basic level, common problems associated with each module and their symptoms, identify steps to isolate and troubleshoot the problems, and given a problem situation, interpret the symptoms and infer the most likely cause.
- Identify, at a basic level, the basic system boot sequences and boot methods, including the steps to create an emergency boot disk with utilities.
- Identify, at a basic level, various troubleshooting procedures and tools, and how to elicit problem symptoms from customers.
- Identify, at a basic level, the procedures for installing/adding a device, including loading, adding, and configuring device drivers, and required software.
- Identify, at a basic level, the various types of preventive maintenance, safety, and environmental protection measures and procedures, and when and how to use them.
- Identify, at a basic level, the procedures necessary to optimize the operating system and major operating system subsystems.

- Distinguish, at a basic level, between the popular CPU chips in terms of their basic characteristics.
- Recognize and interpret, at a basic level, the meaning of common error codes and startup messages from the boot sequence, and identify steps to correct the problems.
- Identify, at a basic level, the types of RAM, form factors, and operational characteristics, and determine banking and speed requirements under given scenarios.
- Recognize, at a basic level, when to use common diagnostic utilities and tools and, given a diagnostic scenario involving one of these utilities or tools, select the appropriate steps needed to resolve the problem.
- Identify, at a basic level, the most popular types of motherboards, their components, and their architecture (bus structures).
- Recognize, at a basic level, common operational and usability problems and determine how to resolve them.
- Identify, at a basic level, the purpose of CMOS memory, what it contains, and how and when to change its parameters and, given a scenario involving CMOS, choose the appropriate course of action.
- Identify, at a basic level, the networking capabilities of Windows and, given various configuration parameters, configure the operating system to connect to a network.
- Identify, at a basic level, printer technologies, interfaces, and options/upgrades, and recognize common printer problems and techniques used to resolve them.
- Identify, at a basic level, the Internet protocols and terminologies, and procedures for establishing Internet connectivity and, given a scenario, configure the operating system to connect to and use Internet resources.

Course-specific General Education goals and objectives

This is not a general education course.

Units of study in detail

Unit I Introduction

Learning Objectives

The student will be able to...

- Understand how the course and lab facilities are structured.
- Identify basic principles of electrical and mechanical safety.
- Identify and use pertinent hand tools.

Unit II Basic Skills

Learning Objectives

The student will be able to...

- Become familiar with the basics of microcomputers.
- Identify various electrical components.
- Remove and insert integrated circuits.
- Identify soldering and desoldering techniques.

Unit III The Windows Operating System

Learning Objectives

The student will be able to...

- Understand the early days of Windows.
- Understand introductory Windows OS.
- Work with "The Desktop".
- Work with "Windows Explorer".
- Work with "The Control Panel".
- Manage printer software.
- Work with "The Accessories".
- Identify basic Windows networking components.
- Install new software.
- Install new hardware.
- Understand Windows CE.
- Identify other non-Windows network operating systems.

Unit IV Computer Networks

Learning Objectives

The student will be able to...

- Explain what a computer network is.
- Understand various network topologies.
- Identify various networking hardware and protocols.
- Work with network applications.
- Understand the Internet.
- Understand Electronic Mail.
- Work through various network design and troubleshooting scenarios.
- Understand Windows NT Domains.
- Understand telecommunications.

Unit V Microcomputer Hardware

Learning Objectives

The student will be able to...

- Identify the types of computer “environments”.
- Teardown and assemble a system.
- Identify and understand power supplies.
- Understand and work with floppy disk drives.
- Understand and work with the motherboard microprocessor and coprocessor.
- Understand and work with the motherboard memory.
- Understand and work with the motherboard expansion slots.
- Identify and understand POST (Power-On Self-Test).
- Replace a motherboard and set it up.
- Understand hard drive fundamentals.
- Understand and implement hard drive backup.
- Replace a hard drive and work with file recovery utilities.
- Identify and work with various types of video monitors and adapters.
- Manage printer hardware.
- Understand and work with keyboards and mice.
- Understand and work with telephone modems.
- Understand and work with CD-ROMs and soundcards.
- Understand and work with other multimedia devices.

Unit VI Other Selected Topics

Learning Objectives

The student will be able to...

- Be familiar with the Intel microprocessor architecture.
- Have a basic understanding of how various computer languages work.
- Identify and understand hardware and software interrupts.
- Be familiar with advanced Intel microprocessors.
- Understand the detail of the system BIOS.
- Be familiar with the Windows internal architecture.
- Understand and work with computer viruses and security.
- Understand and work with various performance and diagnostic software.

Evaluation of student learning

Weekly class attendance and participation	10%
Average of weekly homework	10%
Average of weekly laboratory assignments	20%
Average of Quizzes	20%
Two Unit Tests (<i>Unit III = 10%, Unit V = 10%</i>)	20%
Cumulative Final Exam	20%

Grade Policy

Letter Grades:

Grade	Definition	Nominal %	QPA quality point value
A	Superior Achievement	93-100	4
A-		90-92	3.7
B+		87-89	3.4
B	Above Average Achievement	83-86	3
B-		80-82	2.7
C+		77-79	2.4
C	Average Achievement	70-76	2
D	Minimally Passing	60-69	1
F	Academic Failure	0-59	0
X	Audit — no evaluation		N/A
W	Withdrawal (Student-initiated)		N/A
WI	Withdrawal (Instructor-initiated)		N/A
WA	Withdrawal (Administration-initiated)		N/A
N	No grade reported by the instructor		N/A
I	Incomplete — no credit earned		N/A

Audit:

If you audit the course, you will receive an “X” grade—this cannot be changed to a letter grade at a later date.

Withdrawal Course Requirements:

To receive a W grade for any course, a student must consult with the course instructor or an appropriate division representative and then withdraw officially before two-thirds of the course has been completed by submitting a withdrawal form to the Office of Student Records. Withdrawal after this point results in a grade other than W (usually F). At any time before two-thirds of the course has been completed, the instructor may also withdraw with a W grade any student who has been absent excessively. A student thus withdrawn will not be entitled to any refund of tuition or fees. The student may appeal this action.

Attendance Policy

Mercer County Community College does not have a “cut system.” Students are expected to attend all classes of every course on their schedules. Only illness or serious personal matters may be considered adequate reasons for absence.

It is the prerogative of the instructor to excuse absences for valid reasons, provided the student will be able to fulfill all course requirements.

Student performance in classes is formally verified at each class meeting. If a student's attendance has been infrequent or performance unsatisfactory, he or she may receive notification in the mail. At any time, the instructor may withdraw the student from class for insufficient attendance.

Classroom Conduct Statement

It is the student's responsibility to attend all classes. If a student misses a class meeting for any reason, he/she is responsible for all content that is covered, for announcements made, and for acquiring any materials that may have been distributed in class. It is expected that students be on time for all classes. Students who walk into class after it has begun are expected to choose seats close to where they entered the room so that they do not disrupt the class meeting.

Students are expected to follow ordinary rules of courtesy during the class sessions. Engaging in private, side conversations during class time is distracting to other students and to the instructor. Leaving class early without having informed the instructor prior to class is not appropriate. Unless there is an emergency, leaving class and returning while the class is in session is not acceptable behavior. Disruptive behavior of any type, including sharpening pencils during class while someone is speaking, is not appropriate.

The college welcomes all students into an environment that creates a sense of community of pride and respect; we are here to work cooperatively and to learn together.

Academic Integrity Statement

A student who knowingly represents work of others as his/her own, uses or obtains unauthorized assistance in the execution of any academic work, or gives fraudulent assistance to another student is guilty of cheating. The penalty for violating the honor code is severe. (See *Student Handbook*.) Any student violating the honor code is subject to receive a failing grade for the course and will be reported to the Office of Student Affairs. If a student is unclear about whether a particular situation may constitute an honor code violation, the student should meet with the instructor to discuss the situation.

It is permissible to assist classmates in general discussions of computing techniques; general advice and interaction are encouraged. Each person, however, must develop his or her own solutions to the assigned homework and laboratory exercises. Students may not "work together" on graded assignments. Such collaboration constitutes cheating, unless it is a group assignment. A student may not use or copy (by any means) another's work (or portions of it) and represent it as his/her own.