التوظيف والتدريب
EMPLOYMENT & TRAINING

Computer Technology

Computer Technology

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Workplace Skills for the 21st Century — Secretary's Commission on Achieving Necessary Skills.

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Overview

Vocational training programs in Iraq are faced with many challenges. Iraq needs a speedy reconstruction and the Iraqi people need a future with the promise of employment and prosperity.

This training will combine occupational skills with technical knowledge and will be competency based. We will customize training to meet employer demands, cultural differences, geographic location, and needs of the trainees. The technical approach is modeled after the U.S. Department of Labor, Employment and Training Administration, Office of Job Corps training model. This curricula is competency-based, meaning that the student actually demonstrates a competency in practice and assessments. The Job Corps vocational training curricula consist of competency objectives with corresponding lessons and tasks or skill assignments. Following completion of each level of difficulty or assigned task, assessment tools determine competency and will help with evaluation and remediation. The competency-based instructional programs will:

- Assess the trainee's needs, including strengths and weaknesses
- Select appropriate instructional goals based on the needs assessment
- Provide trainee-centered instruction aimed at the instructional goals
- Evaluate to determine if the trainee has mastered the goals and can apply them

The instructional design (competency-based) will let the trainees demonstrate competency for the skills they already have and then begin instruction at the point where competency is not demonstrated. From there, the trainee will progress through the competencies listed on a Training Achievement Record until they complete training and are prepared to work.

These instructional materials include a Training Achievement Record (TAR). TARs list each competency required for the trade grouped by skill type. The curricula also include sample lesson plans. The curricula will provide for development in general areas prior to competency in more specific trade areas. This allows those who are not able to complete an entire program to develop skills suitable for lower levels of employment.

This curriculum has been developed in collaboration with MOLSA instructors, Job Corps training experts, and other technical professionals. It was created for use in all MOLSA vocational technical training centers that educate and train students to become competent, entry-level Computer Technicians. This curriculum will provide instructors with the necessary ingredients for a complete Computer Technician program. The purpose of this guide is to establish a common language of proficiency standards so that both the Vocational Technical Training Centers and industry have a universal set of standards for Computer programs.

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This curriculum has been developed for use by all Iraq Vocational Technical Training Centers that offer programs in Computer technology. Because of the great diversity among the different regions of the country, this curriculum was designed, to be a flexible document that allows for the differences in instructor methodology. There are also differerences in the length of programs and differences in equipment at some of the MOLSA centers. All content areas and competencies must be integrated into the training center Computer curricula so that students become competent in those areas.

This curriculum does not offer a step-by-step formula for teaching a Computer course. This guide is designed to facilitate the classroom work of Computer instructors but not to replace the decision-maker.

This curriculum has been aligned to modules in the Contren Learning Series as endorsed by the National Center for Construction Education and Research (NCCER). Students who successfully pass this course may be certified by MOLSA and will receive documentation from MOLSA.

It is the instructor who organizes instructional materials for effective and efficient learning. And **it is the instructor** who integrates the latest teaching technologies into his or her classroom. It is in support of these professionals and of their students that this curriculum has been developed.

Each vocational course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Module Number and Title (TAR Skillset)

- Suggested Time to Train on Skillset - An estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the module. The curriculum framework should account for approximately 75-80 percent of the time in the course.

- Competencies and Outcomes
  - A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a module. The student, instructor and worksite supervisor (if applicable) will evaluate and record a pre-training mastery level for all skillsets, as well as a post-training mastery level review.

  - The outcomes represent the enabling and supporting knowledge and demonstrated performances that will indicate mastery of the competency at the course level.

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- Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each competency. Emphasis has been placed on strategies which reflect active learning methodologies. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.

- Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include rubrics, class participation, reflection, and journaling. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources, however, the only required assessment is completion of the TAR checklist.

- References - A list of suggested references is provided for each unit in the appendix. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested outcomes. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

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Table of Contents

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Vocational Training Description

Computer Technology prepares a student for entry-level employment in Computer Technology careers and/or for further study at the postsecondary level. Emphasis is on safety, tools and test equipment, components and functions, microprocessors, power supplies, RAM, motherboards, floppy drives, hard drives, DOS, viruses, expansion bus, windows, application software, internet, customer relations and business practices.

The content of the Computer Technology curriculum framework follows the recommended national standards for the U.S. office of Job Corps.

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Course Outline

Module	*Title*	*Hours*
Module 1:	Employability Skills	4.0 hours
Module 2:	Safety	4.0 hours
Module 3:	Tools and Test Equipment	4.0 hours
Module 4:	Personal Computer Components and Functions	4.0 hours
Module 5:	Microprocessors	4.0 hours
Module 6:	Power Supplies	4.0 hours
Module 7:	Random Access Memory (RAM)	4.0 hours
Module 8:	Motherboards and Bios	4.0 hours
Module 9:	Floppy Drives	4.0 hours
Module 10:	Hard Drives	4.0 hours
Module 11:	DOS (Disk Operating System)	4.0 hours
Module 12:	Computer Viruses	4.0 hours
Module 13:	Expansion Bus	4.0 hours
Module 14:	Windows	4.0 hours
Module 15:	Application Software	4.0 hours
Module 16:	Internet	4.0 hours
Module 15:	Customer Relations and Business Practices	4.0 hours
Module 16:	Employer Specific Skillsets	4.0 hours
Total		***68.0***

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Module 1
Employability Skills
(4 hours)

Competencies and Outcomes	Strategies for Competencies
1. **Employability Skills.** a. Demonstrate the ability to dress properly for work. b. Demonstrate the ability to arrive for work on time. c. Demonstrate the ability to respond properly to supervision. d. Demonstrate the ability to work within and understand a chain of command. e. Demonstrate the ability to follow directions. f. Demonstrate the ability to listen effectively and to ask for help when further information is required. g. Demonstrate the ability to share information and explain procedures to another person. h. Demonstrate the ability to take initiative. i. Demonstrate the ability to satisfy customers. j. Demonstrate the ability to work as a member of a team. k. Demonstrate the ability to work well with diverse races, sexes, ages	**Teaching:** • Introduce the employability skills as listed on the TAR Checklist. • Have the students design and perform skits in front of the class to demonstrate good and bad employability skills. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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and cultures. l. Demonstrate the ability to troubleshoot and solve problems. m. Demonstrate the ability to access and use information from manuals, computers and manufacturers. n. Demonstrate the ability to maintain good hygiene. o. Demonstrate the ability to stay on task. p. Demonstrate the ability to maintain tools and equipment properly.	

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Module 2 Safety (4 hours)

Competencies and Outcomes	Strategies for Competencies
1. Safety a. Understand and use basic safety principals and procedures when working on personal computer equipment. • No watches and jewelry when working on equipment. • Wear goggles when soldering. • Do food or drink around computers. • Do not remove component when power supply is turned on. • Maintain a clean and organized work space. b. Understand and use appropriate grounding procedures to avoid damaging personal computer components with static electricity.	**Teaching:** • Explore safety in the classroom and on the job. • Discuss proper classroom and personal safety procedures to include fire extinguishers, electrical clothing, eye protection and others. • Discuss correct care and usage of computer hardware. • Demonstrate how to handle diskettes and CD's correctly. • Discuss the potential hazards of computer equipment. • Examine security procedures for classroom or job. • Examine the legal implications relating to the computer industry such as software copyright issues; software licensing ethics; and policies. • Review the safe use of internet such as browse, search engines, e-mail and web page design. • Apply proper care and handling of computer hardware such as memory modules and hard disk drives.

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	Discuss proper cleaning and start-up and shut-down procedures. Develop a checklist for cleaning. **Assessment:** • Validate mastery of the skillsets using the TAR checklist.

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Module 3
Tools and Test Equipment
(4 hours)

Competencies and Outcomes	Strategies for Competencies
1. Tools and Test Equipment. a. Understand the names and uses of tools and test equipment needed to troubleshoot and service personal computers.	**Teaching:** • Introduce the tools and test equipment for troubleshooting. • Give each student a computer service problem and have them outline the steps to repair the problem. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 4
Personal Computer Components and Functions
(4 hours)

Competencies and Outcomes	Strategies for Competencies
1. Understanding Personal Computer Components and Functions. a. Understand the function of the following personal computer components. • Central processing unit (CPU). • Random access memory (RAM). • Motherboard (AT, ATX). • Expansion slots (MCA, ISA, EISA, VLB, PCI and AGP). • Power supply. • Floppy drive. • Hard drive. • CD-ROM drive. • Connectors (DB, centronics, etc.), cables (data, power printer, etc.) and ports (com, LPT, USB, PS/2, infrared, etc.). • Sound card. • Video adapter. • Monitor. • Network card.	**Teaching:** • Introduce the following: CPU RAM AT-ATX MCA,ISA,EISA,VLB,PCI,AGP • Discuss the use of the power supply, and the computer tools. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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• Keyboard. • Mouse. • MODEM. • Printer. • Joystick • Jumpers and switch settings. • Computer documentation (manuals).	

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Module 5
Microprocessors
(4 hours)

Competencies and Outcomes	Strategies for Competencies
1- Microprocessors a. Understand the purpose and function of microprocessors. • Understand the function of bus architectures. • Understand the function of the CPU clock versus the external clock speed. • Understand the function of memory relative to the CPU. • Identify and understand CPU families. • 8086 processors. • 80286 processors. • 80386 DX and SX processors. • 486 DX and SX processors. • Pentium processors. o Pentium II – Slot 1. o Pentium III – Slot 1. o Pentium Pro – Socket 8.	**Teaching:** • Introduce the function and use of the microprocessors. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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○ Celeron – Slot 1 and Socket 370 xeon. ○ Cyrix and AMD processors. c. Understand CPU component terminology. • Clock speed. • Registered. • External bus. • Cache (including internal and external, DRAM and SRAM). • Voltage. • Clock multipliers. • Zero insertion force (ZIF) and Pentium Plastic Pin Grid Array (PPGA) sockets.	

Module 6
Power Supplies
(4 hours)

Competencies and Outcomes	Strategies for Competencies
1- Power Supplies a. Understand the purpose and function of a power supply. b. Understand the connection (P8, P9 and ATX connectors) of the power supply to the motherboard. c. Identify connectors (MOLEX, Mini and sub-mini), and understand how to check connectors voltage and make connections to peripheral. d. Understand how to troubleshoot power supplies (voltage) and switches. e. Understand how to replace power supplies and switches.	**Teaching:** • Introduce and demonstrate the following: o Power supplies P8, P9 and ATX Connection to the motherboard. o Connectors (MOLEX, Mini, and sub-mini). o Connector's voltage. o Peripheral connections. o Troubleshooting voltage and switch issues. o Replacement of power supplies and switches. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 7
Random Access Memory (RAM)
(4 hours)

Competencies and Outcomes	Strategies for Competencies
1. Random Access Memory (RAM) a. Identify various types of RAM: 30-Pin SIMM, 27-pin SIMM, DIMM, SDRAMM, PC 100 SDRAM, PC 100 SDRAMM, ECC, etc. b. Understand how to install and test RAM (parity, banking, CMOS messages, tin vs. gold leads).	**Teaching:** • Introduce and practice all RAM applications. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 8
Motherboards and Bios
(4 hours)

Competencies and Outcomes	Strategies for Competencies
1. Motherboards and Bios. a. Identify motherboard from factors and the various components of a motherboard (CPU sockets, expansion slots, chipsets, clock, battery, etc.) b. Understand BIOS and CMOS settings, and how to change CMOS settings (drive types, passwords, etc.). c. Understand ROM and its function. d. Understand how to update BIOS (flash). e. Understand the Power On Self Test (POST) process (POST sequence, beep codes, errors, messages and message codes), and how to troubleshoot POST problems. f. Understand how to choose a motherboard and case, and install a motherboard in a case.	**Teaching:** • Introduce the motherboard and bios. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 9 Floppy Drives (4 hours)

Competencies and Outcomes	Strategies for Competencies
1. Floppy Drives a. Identify types of floppy drives, and floppy drive designations. b. Correctly cable (data and power cables), make CMOS settings and test install drivers. c. Understand how to troubleshoot floppy drives (cables, power, CMOS settings, controller, drive).	**Teaching:** • Introduce all aspects of floppy drives. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 10 Hard Drives (4 hours)

Competencies and Outcomes	Strategies for Competencies
1. Hard Drives a. Understand the types (IDE/EIDE, SCSI) and geometry (heads, cylinders, sectors, tracks) and capacities of hard drives. b. Understand hard drive terminology and conventions (formatting, partitioning, file allocation table (FAT), sectors and clusters, and fragmentations). c. Understand how hard drives are jumpered, installed in the case and cabled (data and power cables). d. Understand how to get CMOS to recognize the hard drive (manual and auto detect, LBA Normal and Large). e. Understand data transfer modes (PIO and DMA). f. Understand how to diagnose and correct hard drive data problems (fragmented and cross linked files) using diagnostic software (Norton Utilities, Scandisk, etc.)	**Teaching:** • Introduce all of the Hard Drive processes. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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g. Understand and correct hard drive CMOS and hardware problems (CMOS connectivity, lost boot and partition information, cables, data and power). h. Understand RAID Levels 0, 1 and 5.	

Module 11
DOS (Disk Operating System)
(4 hours)

Competencies and Outcomes	Strategies for Competencies
1. DOS (Disk Operating System) a. Understand the purpose of operating systems and the history of DOS user interface. b. Understand DOS 8.3 file naming conventions and illegal characters. c. Understand file extensions (exe. pd., bmp. doc., etc.) and how they are used to identify file types. d. Understand DOS drives and directions (folder). e. Understand DOS files (IO, MSDOS, and COMMAND.com). f. Understand the DOS user interface and the DOS prompt. g. Understand DOS commands and file directory navigation (path attributes, CD, MD, copy, x copy, copy con, delete, move, type, edit, etc.). h. Understand how to run programs under DOS (.EXE, .BAT, .com).	**Teaching:** • Introduce the disk operating system (DOS). **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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i. Understand how DOS communicates with hardware (DOS device drivers). j. Understand (DOS CONFIG, SYS commands, Buffers, STACKS, FILES, SHELL, DEVICE, etc.). k. Understand AUTOEXEC.BAT commands (Mouse, Path, Prompt, etc.). l. Understand DOS diagnostic commands (CHKDSK, SCANDISK, DEFRAG, MSCDEX, etc.). m. Understand DOS external (FDISK, X-COPY, SYS, etc.) versus internal commands (DIR, MD, CD, etc.).	

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Module 12
Computer Viruses
(4 hours)

Competency and Outcomes	Strategies for Competencies
1. Computer Viruses a. Understand types of computer viruses (MBR, memory resident, macro, etc.). b. Understand how to protect the computer against viruses. c. Understand how to detect and delete viruses from computers and floppy disks.	**Teaching:** • Introduce the concept of computer viruses. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 13
Expansion Bus
(4 hours)

Competency and Outcomes	Strategies for Competencies
1. Expansion Bus a. Understand the function of 8, 16, 32, 64 – Bit expansion busses (ISA, EISA, VLB, PCI, etc.). b. Understand I/O addresses. c. Understand the function of interrupts (IRQs). d. Understand I/O ports (COM and LPT) and how they are configured (IRQ, I/O addresses and modes.) e. Understand how the computer utilizes Direct Memory Access (DMA). f. Understand the function of expansion cards and Plug-n-Play. g. Understand how to install and configure peripheral devices (MODEMS, video cards, sound cards, CD-ROM drivers, etc.)	**Teaching:** • Introduce the elements of Expansion Bus. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 14 Windows (4 hours)

Competency and Outcomes	Strategies for Competencies
1.Windows a. Understand the function of windows 9x/2000, MSDOS. SYS, and the windows graphical user interface (GUI). b. Understand the basic features of windows 9x/2000 (task bar, shut down, restart, restart in MS-DOS mode, run, help, find, setting, documents, and programs, etc.). c. Understand the windows 9x/2000 file structure (FAT 16, FAT 32, and NTFS) and how device drivers are configured and maintained. d. Understand and demonstrate how to upgrade from a previous version of Windows to a newer version. e. Understand and demonstrate how to run a DOS program in windows 9x/2000 MS-DOS mode.	**Teaching:** • Introduce all window functions. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 15
Application Software
(4 hours)

Competency and Outcomes	Strategies for Competencies
1. Application Software a. Understand and connect common software problems. • BSOD (Blue Screen of Death). • GPF (General Protection Fault). • Illegal Operations. • VxD errors. • Missing DLL files. b. Install various software applications on the hard drive. c. Use internal help files to solve application software problems.	**Teaching:** • Introduce the application of software. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 16 Internet (4 hours)

Competency and Outcomes	Strategies for Competencies
1. Internet a. Set-up Internet access (dial-up and LAN). b. Install, configure and use an Internet browser. c. Demonstrate basic e-mail functions. • Open and save files. • Send attachment. • Open attachment. • Send messages to multiple recipients. • Know difference among To, CC and BCC addressing.	**Teaching:** • Introduce aspects of Internet. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Module 17
Customer Relations and Business Practices
(4 hours)

Competency and Outcomes	Strategies for Competencies
1. Customer Relations and Business Practices. a. Demonstrate the ability to troubleshoot a personal computer problem, describe the problem to the customer (in layman's language) and explain the process and cost (material and labor) to correct the problem. b. Demonstrate the ability to prepare a customer invoice itemizing for parts, labor and tax.	**Teaching:** • Introduce the issues of customer relations. **Assessment:** • Validate mastery of the skillsets using the TAR Checklist.

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Appendix A

TAR
(Training Achievement Record)

Evaluation Checklist for Computer Technology

A. When the student performs a task listed in the "DUTIES AND TASKS" column, the instructor should rate the student's level of performance by circling a, b, or c in the "PERFORMANCE RATING" column.

RATING

a - Proficient and able to teach others	The student consistently performs the task accurately without supervision. The student possesses sufficient skill to teach the task to others.
b - Proficient	The student performs the task to industry standards with little or no supervision. This is the minimum performance rating for TAR skill completion.
c - Exposed/not proficient	The student has been introduced to the task, but cannot perform the task to industry standards.

1. If the student performs the task at a level c, circle the number in pencil so that it can later be erased and entered permanently as b or a when the student improves his/her performance. A performance level of b is satisfactory (passing) and can be entered permanently or, at the instructor's discretion, circled in pencil to allow the student to improve his/her performance at a later date.
2. When the student performs the task to the instructor's satisfaction, (**at a level of b or a**) circle the appropriate performance rating, and enter the date in the **"DATE COMPLETED"** column. The instructor and student should initial the **DUTY** area when **all the tasks** in that duty area are completed.

B. When the student completes the TAR or terminates the program before completing the TAR, the instructor must finalize the TAR by doing the following:

1. Check the appropriate box and enter the date that the student completed the TAR or terminated the training program in the space provided at the top of page 1:

□ Completed or □ Terminated Training: _____
Date

COMPUTER SERVICE TECHNICIAN
Computer Service Technician – Level I

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TRAINING ACHIEVEMENT RECORD (TAR) FOR:

Name:

SSN:

Date Entered Training:

☐ Completed or ☐ Terminated Training:_____Date

JOB CORPS CENTER:

Address:

Phone:

Instructor:

PREREQUISITE:

None

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
A. EMPLOYABILITY SKILLS				
1. Demonstrate the ability to dress properly for work.	1 2 3			
2. Demonstrate the ability to arrive for work on time.	1 2 3			
3. Demonstrate the ability to respond properly to supervision.	1 2 3			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
4. Demonstrate the ability to work within and understand a chain of command.	1 2 3			
5. Demonstrate the ability to follow directions.	1 2 3			
6. Demonstrate the ability to listen effectively and to ask for help when further information is required.	1 2 3			
7. Demonstrate the ability to share information and explain procedures to another person.	1 2 3			
8. Demonstrate the ability to take initiative.	1 2 3			
9. Demonstrate the ability to satisfy customers.	1 2 3			
10. Demonstrate the ability to work as a member of a team.	1 2 3			
11. Demonstrate the ability to work well with diverse races, sexes, ages and cultures.	1 2 3			
12. Demonstrate the ability to troubleshoot and solve problems.	1 2 3			
13. Demonstrate the ability to access and use information from manuals, computers, and manufacturers.	1 2 3			
14. Demonstrate the ability to maintain good hygiene.	1 2 3			
15. Demonstrate the ability to stay on task.	1 2 3			
16. Demonstrate the ability to maintain tools and equipment properly.	1 2 3			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
B. SAFETY				
1. Understand and use basic safety principles and procedures when working on personal computer equipment.				
a. no watches or jewelry when working on equipment.	1 2 3			
b. wear goggles when soldering.	1 2 3			
c. no food or drink around computers.	1 2 3			
d. do not remove components when power supply is turned on.	1 2 3			
e. maintain a clean and organized work space.	1 2 3			
2. Understand and use appropriate grounding procedures to avoid damaging personal computer components with static electricity.	1 2 3			
C. TOOLS AND TEST EQUIPMENT				
1. Understand the names and uses of tools and test equipment needed to troubleshoot and service personal computers.	1 2 3			
D. PERSONAL COMPUTER COMPONENTS AND FUNCTIONS				
1. Understand the function of the following personal computer components.				
a. central processing unit (CPU)	1 2 3			
b. random access memory (RAM)	1 2 3			
c. motherboard (AT, ATX)	1 2 3			
d. expansion slots (MCA, ISA, EISA, VLB, PCI, AGP)	1 2 3			
e. power supply	1 2 3			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
f. floppy drive	1 2 3			
g. hard drive	1 2 3			
h. CD-ROM drive	1 2 3			
i. connectors (DB, Centronics, etc.), cables (data, power, printer, etc.) and ports (COM, LPT, USB, PS/2, infrared, etc.)	1 2 3			
j. soundcard	1 2 3			
k. video adapter	1 2 3			
l. monitor	1 2 3			
m. network card	1 2 3			
n. keyboard	1 2 3			
o. mouse	1 2 3			
p. MODEM	1 2 3			
q. printer	1 2 3			
r. joystick	1 2 3			
s. jumpers and switch settings	1 2 3			
t. component documentation (manuals)	1 2 3			
E. MICROPROCESSORS				
1. Understand the purpose and function of microprocessors.				
a. Understand the function of bus architectures.	1 2 3			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
b. Understand the function of the CPU clock versus the external clock speed.	1 2 3			
c. Understand the function of memory relative to the CPU.	1 2 3			
2. Identify and understand CPU families.				
a. 8086 processors	1 2 3			
b. 80286 processors	1 2 3			
c. 80386 DX and SX processors	1 2 3			
d. 486 DX and SX processors	1 2 3			
e. Pentium processors				
(1) Pentium (original) - Socket 7	1 2 3			
(2) Pentium II - Slot 1	1 2 3			
(3) Pentium III - Slot 1	1 2 3			
(4) Pentrium Pro - Socket 8	1 2 3			
(5) Celeron - Slot 1 and Socket 370	1 2 3			
(6) Xeon	1 2 3			
f. Cyrix and AMD processors	1 2 3			
3. Understand CPU component terminology.				
a. clock speed	1 2 3			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
b. register	1 2 3			
c. external bus	1 2 3			
d. address bus	1 2 3			
e. cache (including internal and external, DRAM and SRAM)	1 2 3			
f. voltage	1 2 3			
g. clock multipliers	1 2 3			
h. Zero Insertion Force (ZIF) and Pentium Plastic Pin Grid Array (PPGA) sockets	1 2 3			
F. POWER SUPPLIES				
1. Understand the purpose and function of a power supply.	1 2 3			
2. Understand the connection (P8, P9, and ATX connectors) of the power supply to the motherboard.	1 2 3			
3. Identify connectors (MOLEX, Mini and Sub-Mini), and understand how to check connector voltage and make connections to peripherals.	1 2 3			
4. Understand how to troubleshoot power supplies (voltage) and switches.	1 2 3			
5. Understand how to replace power supplies and switches.	1 2 3			
G. RANDOM ACCESS MEMORY (RAM)				
1. Identify various types of RAM: 30-Pin SIPP, 30-Pin SIMM, 72-Pin SIMM, DIMM, SDRAM, PC100 SDRAM, ECC, etc.	1 2 3			
2. Understand how to install and test RAM (parity, banking, CMOS messages, tin vs. gold leads).	1 2 3			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
H. MOTHERBOARDS AND BIOS				
1. Identify motherboard form factors and the various components of a motherboard (CPU sockets, expansion slots, chipsets, clock, battery, etc.).	1 2 3			
2. Understand BIOS and CMOS functions, the difference between BIOS and CMOS settings, and how to change CMOS settings (drive types, passwords, etc.).	1 2 3			
3. Understand ROM and its function.	1 2 3			
4. Understand how to update BIOS (flash).	1 2 3			
5. Understand the Power On Self Test (POST) process (POST sequence, beep codes, errors, messages and message codes), and how to troubleshoot POST problems.	1 2 3			
6. Understand how to choose a motherboard and case, and install a motherboard in a case.	1 2 3			
I. FLOPPY DRIVES				
1. Identify types of floppy drives (3-1/2" and 5-1/4"), and floppy drive designations (A or B).	1 2 3			
2. Correctly cable (data and power cables), make CMOS settings and test installed drives.	1 2 3			
3. Understand how to troubleshoot floppy drives (cable, power, CMOS settings, controller, drive).	1 2 3			
J. HARD DRIVES				
1. Understand the types (IDE/EIDE, SCSI) and geometry (heads, cylinders, sectors, tracks) and capacities of hard drives.	1 2 3			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
2. Understand hard drive terminology and conventions (formatting, partitioning, file allocation table [FAT], sectors and clusters, and fragmentation).	1 2 3			
3. Understand how hard drives are jumpered, installed in the case and cabled (data and power cables).	1 2 3			
4. Understand how to get CMOS to recognize the hard drive (manual and autodetect, LBA, Normal, Large).	1 2 3			
5. Understand data transfer modes (PIO and DMA).	1 2 3			
6. Understand how to diagnose and correct hard drive data problems (fragmented and cross linked files) using diagnostic software (Norton Utilities, Scandisk, etc.).	1 2 3			
7. Understand and correct hard drive CMOS and hardware problems (CMOS, connectivity, lost boot and partition information, cables (data and power)).	1 2 3			
8. Understand RAID Levels 0, 1 and 5.	1 2 3			
K. DOS (DISK OPERATING SYSTEM)				
1. Understand the purpose of operating systems, the history of DOS, and the DOS user interface.	1 2 3			
2. Understand DOS 8.3 file naming conventions (xxxxxxxx.xxx) and illegal characters.	1 2 3			
3. Understand file extensions (.exe, .wpd, .bmp, .doc, etc.) and how they are used to identify file types.	1 2 3			
4. Understand DOS drives and directories (folders).	1 2 3			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
5. Understand DOS' system files (IO.SYS, MSDOS.SYS, COMMAND.COM).	1 2 3			
6. Understand the DOS user interface and the DOS prompt (C:\>).	1 2 3			
7. Understand DOS commands and file/directory navigation (Path, *.*, Attributes, CD, MD, COPY, XCOPY, COPY CON, DELETE, MOVE, TYPE, EDIT, etc.).	1 2 3			
8. Understand how to run programs under DOS (.EXE, .BAT, .COM).	1 2 3			
9. Understand how DOS communicates with hardware (DOS device drivers).	1 2 3			
10. Understand DOS CONFIG.SYS commands (BUFFERS, STACKS, FILES, SHELL, DEVICE, etc.).	1 2 3			
11. Understand AUTOEXEC.BAT commands (Mouse, Path, Prompt, etc.).	1 2 3			
12. Understand DOS diagnostic commands (CHKDSK, SCANDISK, DEFRAG, MSCDEX, etc.).	1 2 3			
13. Understand DOS external (FDISK, XCOPY, SYS, etc.) versus internal commands (DIR, MD, CD, etc.).	1 2 3			
L. COMPUTER VIRUSES				
1. Understand types of computer viruses (MBR, memory resident, macro, etc).	1 2 3			
2. Understand how to protect the computer against viruses.	1 2 3			
3. Understand how to detect and delete viruses from computers and floppy disks.	1 2 3			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
M. EXPANSION BUS				
1. Understand the function of 8, 16, 32, 64-Bit expansion busses (ISA, EISA, VLB, PCI, etc.).	1 2 3			
2. Understand I/O addresses.	1 2 3			
3. Understand the function of interrupts (IRQs).	1 2 3			
4. Understand I/O ports (COM and LPT) and how they are configured (IRQ, I/O addresses, and modes).	1 2 3			
5. Understand how the computer utilizes Direct Memory Access (DMA).	1 2 3			
6. Understand the function of expansion cards and Plug-n-Play.	1 2 3			
7. Understand how to install and configure peripheral devices (MODEMS, video cards, sound cards, CD-ROM drives, etc.).	1 2 3			
N. WINDOWS				
1. Understand the function of Windows 9x/2000, MSDOS.SYS, and the Windows graphical user interface (GUI).	1 2 3			
2. Understand the basic features of Windows 9x/2000 (task bar, shut down, restart, restart in MS-DOS mode, run, help, find, settings, documents, and programs, etc.).	1 2 3			
3. Understand the Windows 9x/2000 file structure (FAT16, FAT32, NTFS) and how device drivers are configured and maintained.	1 2 3			
4. Understand and demonstrate how to upgrade from a previous version of Windows to a newer version.	1 2 3			
5. Understand and demonstrate how to run a DOS program in Windows 9x/2000 MS-DOS mode.	1 2 3			

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
6. Understand and demonstrate how to install and uninstall application programs (DOS, Windows 3.x and Windows 9x/2000 programs).	1 2 3			
7. Understand and demonstrate how to perform basic Windows 9x/2000 troubleshooting tasks to resolve lockups and configuration problems (using the Device Manager, Hardware Wizards, and Safe Mode).	1 2 3			
8. Understand and demonstrate how to install and configure (device drivers, settings, preferences) in Windows 9x/2000 on a new personal computer.	1 2 3			
9. Understand the differences between Windows 3.x and Windows 9x/2000.	1 2 3			
O. APPLICATION SOFTWARE				
1. Understand and correct common software problems.				
a. BSOD (Blue Screen of Death)	1 2 3			
b. GPF (General Protection Fault)	1 2 3			
c. Illegal Operations	1 2 3			
d. VxD errors	1 2 3			
e. Missing DLL files	1 2 3			
2. Install various software applications on the hard drive.	1 2 3			
3. Use internal help files to solve application software problems.	1 2 3			
P. INTERNET				
1. Set up Internet access (dial-up and LAN).	1 2 3			
2. Install, configure and use an Internet browser.	1 2 3			
3. Demonstrate basic e-mail functions.				

DUTIES AND TASKS	PERFORMANCE RATING	DATE COMPLETED	INSTRUCTOR'S INITIALS	STUDENT'S INITIALS
a. open and save files	1 2 3			
b. send attachment	1 2 3			
c. open attachment	1 2 3			
d. send messages to multiple recipients	1 2 3			
e. know difference among TO, CC, and BCC addressing.	1 2 3			
Q. CUSTOMER RELATIONS AND BUSINESS PRACTICES				
1. Demonstrate the ability to troubleshoot a personal computer problem, describe the problem to the customer (in layman's language) and explain the process and cost (materials and labor) to correct the problem.	1 2 3			
2. Demonstrate the ability to prepare a customer invoice itemizing costs for parts, labor and sales tax.	1 2 3			
R. EMPLOYER SPECIFIC SKILLS (OPTIONAL)				
1.	1 2 3			
2.	1 2 3			
3.	1 2 3			
4.	1 2 3			
5.	1 2 3			

Appendix B

Workplace Skills for the 21st Century for Computer Technology

Work Place Skills for the 21st Century for All Modules

WP1 Allocates resources (time, money, materials and facilities, and human resources).

WP2 Acquires, evaluates, organizes and maintains, and interprets/ communicates information, including the use of computers.

WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/ costumers, exercising leadership, negotiation, and working with culturally diverse.

WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.

WP5 Selects, applies, and maintains/ troubleshoot technology.

WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.

WP7 Basic Skills: Employs basic academic skills including reading, writing, arithmetic and mathematics, speaking, and listening.

WP8 Personal Qualities: Practices work ethics related to individual responsibility, integrity, honesty, and personal management.

Appendix C

Suggested References

Suggested References

Desktop system software and hardware for network users, (Latest Ed.). Comptia A+ Corporation, Oakbrook Terrace, Illinois: Orem, UT: Novell Inc., South-Western.

Introduction to networking, (Latest Ed.), Microsoft Corporation, Redmond, Wash., Orem, UT: Novell, Inc., South-Western.

Windows XP, Microsoft Corporation, Redmond, Wash.

Office 2003, Microsoft Corporation, Redmond, Wash.

Advanced Teknowlogy 2002, CTT + Professionals, Pedrotti Group, Inc. Sebastopol, CA.

CTT + train the trainer, Pedrotti Group, Inc., Sebastopol, CA.

Appendix D

Recommended Tools & Equipment

ITEM	QTY
Pentium 4 CPU 1.7 with 128 cash memory, 256 MB RAM, 40 GGB HDD, 845 Mb. Intel Chipset, Video Card Built in, Sound Card Built in, CD Drive 52X, Floppy Drive	21 each
Ethernet adapter Card	21 each
RJ 45 Modular Connecter	100
UTP Cable	1 Package
Ethernet Switch 24 Port	1
Ethernet Router	1
Internet VSAT	1
Laser Printer	1
Color Inkjet printer	1
CRT Projector	1
UPS 650 VA	21 each
Scanner	1
Tools Kit Bag (Clipper, scrow Driver, pliers, UTP Tester, Tweezers)	1
Wireless Microphone	1
amplifier	1
Speaker 100 W	2
Flat Panel (18 db) (optional)	1
Wire 15 M (optional)	1
wireless Lan card 10 X (optional)	1