MISSION TRAILS REGIONAL OCCUPATION PROGRAM

1. **COURSE TITLE:** COMPUTER MAINTENANCE AND REPAIR

2. **CBEDS TITLE:** COMPUTER SERVICE TECHNOLOGY

3. **CBEDS NUMBER:** 5558

4. **JOB TITLES:**
   PC Support Technician
   Bench Technician
   PC Service Technician
   Help Desk Technician
   PC Sales Specialist

5. **COURSE DESCRIPTION:** This course is for all students seeking a variety of skills in the computer field. This is a comprehensive introduction to the specialized subject of elementary computer maintenance and repairs. Students will be able to learn and develop entry level skills through classroom small/large group interaction, lab training, and cooperative learning methodologies. Students will obtain fundamental computer servicing skills by performing the maintenance, simple repairs, analysis and parts replacement of computers. Students will develop professional attitudes and skills to meet career performance standards through group interaction while completing assignments and hands-on projects. Students will develop essential competencies and foundational critical thinking skills throughout the process of completing projects within groups and/or individual activities. Expected student outcomes include developing skills to dismantle computer systems for identification of faulty components. Identify and remedy malfunction symptoms, determine correct component replacements and accurately replace new and/or used equipment components to re-construct units to full operation. Student outcomes and program effectiveness are evaluated through measures of achievement of completed assignments and projects, and written theory examination as required by the instructor and instruction materials.

6. **HOURS:** 360 hours = 2 semesters

7. **PREREQUISITES:** Keyboarding 25 wpm, or Business Tech 1-2

8. **REVISION DATE:** November 1, 2007

9. **CDE RECERTIFICATION:** January 12, 2004

10. COURSE OUTLINE:

a. CONTENT AREA SKILLS:

i. EXPECTED STUDENT OUTCOMES

ii. HOURS OF INSTRUCTION

COURSE OUTLINE

CONTENT AREA SKILLS	EXPECTED STUDENT OUTCOMES	HOURS CL = Classroom CC = Comm. Class. CP = Co-op Ed.		
Instruction will include:	**Student will be able to:**	**CL**	**CC**	**CP**
1. **Computer Orientation:** Acquaintance with the events and development of computers and significant people and their contributions throughout the history of computers	1a.) Describe events and name a minimum of 4 individuals significant to the development of computers. 1b.) Define a minimum of 10 general computer terms. 1c.) Set goals in the computer industry by identification of self-marketable or potential skills.	10		
2**. External Computer Hardware and basic computer operations:** An introduction to external computer components of a computer system, and the primary Tools of the Trade.	2a.) Describe procedures for powering up an operational computer system. 2b.) Understand a system menu, demonstrate the execution of application and power down the system. 2c.) Describe the use of word Processing, Spreadsheets, Database, and presentation software. 2d.) Understand and describe external physical hardware of a computer 2e.) Describe the procedure for handling and care of diskettes and operational equipment. 2f.) Understand and define a microprocessor, hard drive, and memory. 2g.) Demonstrate the use of elementary system commands to query a system. 2h.) Demonstrate the use of tools common to computer technicians and name a minimum of 4 tools used frequently by technicians.	10	5	
3. **The System Board:** Students will be introduced to the types of system board architecture, the Central Processing Unit chip and Chipset. Introduction will also include Memory types, System Bus, Expansion Slots, Power Supply connections, Interrupt Request Numbers, and numbering Systems.	3a.) Identify and name all major components of the system board. 3b.) Understand and describe how the system board transports data, follows logic process, coordinates clock timing and executes a processing task. 3c.)Select a system board and CPU to assemble a system. 3d.) Demonstrate how to remove and replace components to improve/upgrade a computer system. 3e.) Calculate internal CPU clock speeds utilizing mathematical computations of Mhz speeds and CPU Multipliers. 3f.) Identify a minimum of 2 types of memory	25	5	

	modules. 3g.) Demonstrate the proper systemboard power connections. 3h.) Identify and calculate memory addresses using Hexadecimal, decimal, and binary number systems.			
4. **Floppy Drives and Other Essential Devices:** An introduction to how data is stored physically and logically on a disk, the formatting processing, using operating systems to manage data and drives. Keyboards, Monitors, Mouse devices will also be introduced briefly as primary devices of a system.	4a.) Describe the mapping of data by tracks and sectors and the logical placement of magnetic media for the floppy drives. 4b.) Demonstrate the use of DOS and Windows to format both a system and data disk for storage purposes. 4c.) Demonstrate how to remove and replace floppy drives to a dysfunctional system. 4d.) Demonstrate basic cleaning and external maintenance of other external components of a computer system.	10	5	
5. **Hard Drives:** An introduction to the physical layout and design of hard drives and Hard Drive Technologies. Introduction is presented to the organization, management and optimization of data stored on hard drives.	5a.) Explain and demonstrate how to partition a physical and logical hard drive using DOS and HDD manufacturer utilities. 5b.) Demonstrate how to format a hard drive with appropriate operating system. 5c.) Demonstrate and explain the use of a minimum of five DOS utility commands to manage a hard drive. 5d.) Demonstrate and explain the use of a minimum of five Windows-based commands to manage a hard drive. 5e.) Describe at least one hard drive technology commonly used in computer systems.	25	5	
6. **Hard Drive Installation and Support:** An introduction to installing, setting jumpers, Low Level Formatting, Partitioning, High Level Formatting, 3rd party utility tools. An introduction is also covered in hard drive troubleshooting guidelines.	6a.) Demonstrate the physical installation procedure for a hard drive, set jumpers according to configuration, partition, format, and install an operating system and commercially relative software package. 6b.) Demonstrate and select at least one alternative choice in troubleshooting a given hard drive malfunction.	20	5	
7. **Troubleshooting Fundamentals:** An introduction to a variety of perspectives in alternative troubleshooting techniques and flow charts. An introduction to Ethics of Copyrights and archival procedures. An introduction to Internet Access for downloading utilities and the ethics and etiquette of using the Internet.	7a.) Use one of the three flowcharts in developing and improving troubleshooting techniques and options for dysfunctional computer systems. 7b.) Identify a minimum of 4 selective malfunctions, possible causes, and recommend 1 of 2 options of corrective measures. 7c.) Use at least one commercial software diagnostic tool to correct a minor hardware malfunction. 7d.) Use and demonstrate a commercial anti-virus software to eliminate and eradicate a computer virus. 7e.) Demonstrate skills learned to dismantle a malfunctioning unit and accurately replace with new/used components.	30	5	

	7f.) Demonstrate skills learned to accurately reassemble a system for an end-user. 7g.) Describe the ethics of copyright laws and procedures for proper and ethical use of resource materials obtained via internet or other sources. 7h.) Demonstrate how to access the WWW to download utility tools for maintenance purposes and proper etiquette in the use of online communications. 7g.) Demonstrate and apply skills learned to access the WWW to research and apply new technology information to the needs of computer servicing.			
8. **Custom Computer Assembly:** Students will research and compare quality and prices for individual computer components required to assemble a PC. Students will select components for a PC based on research data. Students will assemble, configure and install commercial software for end-user purposes.	8a.) Demonstrate logical thinking skills to research cost and quality of PC components. 8b.) Discuss and evaluate comparative prices of selective components required to assemble a new PC unit. 8c.) Plan and implement the assembly of a new computer system. 8d.) Apply skills learned to recognize errors and defective equipment during the assembly process. 8e.) Apply skills learned to configure a new computer system. 8f.) Apply skills learned to install commercial software to a newly assembled system.	30	5	
9. **System Peripheral Equipment:** An introduction to Expansion Slots, CD-ROM and other Multi-media devices and software.	9a.) Demonstrate how to expand a computer system by upgrading a unit with Compact Disc Read Only Memory (CDROM) Drives. 9b.) Demonstrate how to install and execute multimedia software to enable a computer with sound. 9c.) Demonstrate and explain the need to maintain and care for CD ROM drives.	20	5	
10. **Memory Management:** An introduction to physical memory module types, how memory is used by operating systems, memory troubleshooting guidelines, upgrading memory on a system board and managing memory.	10a.) Describe a minimum of two types of Memory Modules used by different Computer Architectures. 10b.) Describe how an operating system utilizes memory to manage and execute software. 10c.) Describe a minimum of two malfunction symptoms and corrective measures for each. 10d.) Demonstrate and describe proper procedure to remove and replace memory modules in a malfunctioning system. 10e.) Demonstrate skills learned to manage memory by creating configuration files for at least one operating system.	20	5	
11. **Electricity and Power Supplies:** An introduction to basic electricity concepts of Voltage, Amps, Ohms, Current, Resistance and Wattage. An introduction to Surge Protection and the use of a multi-meter to measure voltage supply.	11a.) Demonstrate skills learned by using a multimeter to measure and determine minimum and maximum power outage for a minimum of 5 power cables used by internal computer components. 11b.) Demonstrate skills learned by removing and replacing a power supply	20	5	
12. **Introduction to Network Stations:**	12a.) Demonstrate skills learned by selecting and	25	5	

An elementary introduction to features of an operating system for a network workstation, environment, and network architecture.	installing an appropriate network operating system. 12b.) Demonstrate how to organize a workstation Registry and Policies.			
13. **Operating System Commands:** An introduction to DOS and Windows operating environments.	13a.) Demonstrate knowledge of a minimum of two operating systems by using a variety of system commands to manage, organize stored files. 13b.) Demonstrate knowledge of the Operating system command to edit, and structure the configuration and system executable files. 13c.) Demonstrate knowledge of a minimum of five Windows environment commands to edit and maintain Policy restrictions for end-users.	25	5	
14. **Commercial Diagnostic Tools and Software:** An introduction to commercial diagnostic tools for reviving hard drives, diagnosing component malfunctions, detect system configuration and hardware data. Diagnose system board and processor information. An introduction to rebuilding Master Boot Records and File Allocation Tables. Analyze and detect defective memory addresses and modules.	14a.) Demonstrate knowledge of diagnostic equipment and utilities by analyzing a minimum of 1 defective hard drive. 14b.) Demonstrate knowledge of diagnostic equipment and utilities by analyzing a minimum of 1 defective module of memory. 14c.) Demonstrate knowledge of Master Boot Records by utilizing diagnostic toll to re-build a damaged MBR on one Hard Drive. 14d.) Demonstrate knowledge of diagnostic equipment to detect defective memory addresses on a minimum of one type of Memory Module.	25	5	

CAREER PERFORMANCE STANDARDS	EXPECTED STUDENT OUTCOMES	HOURS		
Instruction will include:	**Student will be able to:**			
1. **Personal Skills** ▪ Classroom policies & procedures ▪ Ethics → Work → Business ▪ Sexual harassment laws ▪ Personal skills, including positive attitude, self-confident, honesty, perseverance & self-discipline ▪ Professional appearance ▪ Time management ▪ Lifelong learning	**1. Understand how personal skill development, including positive attitude, honesty, self-confidence, time management, & other positive traits affect employability.** ▪ Demonstrate and understand classroom policies & procedures ▪ Define work and business ethics & demonstrate the importance of ethical standards & social responsibilities in the business environment. ▪ Discuss the laws applicable to sexual harassment & discuss tactics for handling harassment situations. ▪ Demonstrate personal skills in class and/or business environment: → Positive attitude → Self-confidence → Honesty → Perseverance → Self-discipline ▪ Demonstrate and model personal hygiene and acceptable professional attire ▪ Prioritize tasks and meet deadlines ▪ Explain the importance of lifelong learning			
2**. Interpersonal Skills** ▪ Group dynamics ▪ Conflict resolution and negotiation ▪ Team work ▪ Etiquette across gender and cultural groups	**2. Understand principles of effective interpersonal skills, including group dynamics, conflict resolution, and negotiation** ▪ Identify and explain the key concepts of group dynamics ▪ Discuss and demonstrate the dynamics of conflict resolution and negotiation, and their importance within the business environment ▪ Demonstrate effective teamwork, share responsibilities, accept supervision and assume leadership roles ▪ Demonstrate cooperative working relationships and proper etiquette across gender and cultural groups	10	5	

3. **Thinking and Problem-Solving Skills** ▪ Critical and creative thinking skills ▪ Logical reasoning and problem-solving skills ▪ Numerical estimation, measurement, and calculation ▪ Identify, locate, and organize needed information and propose, evaluate, and select alternative solutions	**3. Understand the importance of critical thinking and problem-solving skills in the workplace.** ▪ Apply critical and creative thinking skills in a work environment and implement a plan of improvement as needed ▪ Demonstrate logical reasoning and problem solving skills in a work environment ▪ Apply numerical estimation, measurement and calculation skills to business applications including the following: → Whole number math → Decimals & fractions → Counting & monetary functions → Use of tables & graphs ▪ Recognize problem situations; identify, locate and organize needed information, and propose, evaluate and select from alternate solutions	25	5	
4. **Communication Skills** ▪ Written communications ▪ Verbal and Nonverbal communications ▪ Active and effective listening ▪ Proper etiquette in business communications ▪ Writing and editing skills ▪ Use of reference material and handbooks ▪ Oral presentations	4. Understand principles of effective communication. ▪ Read and implement written instructions, technical manuals, written communication, and reference books ▪ Present a positive image of verbal and nonverbal communication through use of appropriate methods ▪ Demonstrate active and effective listening skills though verbal, nonverbal and written feedback ▪ Demonstrate proper etiquette in business communications, including an awareness of requisite for international communications (languages, customs, and time zones) ▪ Demonstrate the following writing and editing skills: → Use correct grammar, punctuation, capitalization, vocabulary and spelling → Write, proofread and edit → Select and use appropriate forms of communication ▪ Exhibit a proficiency in the use of reference materials such as dictionary, thesaurus, telephone directory, almanac, zip code directory, and office handbooks	10	5	
5. Occupational Safety	6. Understand occupational safety issues, including avoidance of physical hazards	25	5	

▪ Good safety practices	▪ Model and implement good safety practices including: → Avoidance and reporting of physical hazards in the work environment → Safe operation of equipment → Proper handling of hazardous materials			
6. Employment Literacy ▪ Expand awareness of career opportunities ▪ Set employment goals characteristics and interests ▪ Develop portfolio to C-TAP standards ▪ Develop interviewing techniques	**6. Understand career paths and strategies for obtaining employment.** ▪ Explore career opportunities and develop a career plan ▪ Identify steps for setting goals and writing personal goals and objectives ▪ Examine aptitudes related to career options; relate personal characteristics and interests to educational and occupational opportunities ▪ Develop a portfolio to include the following: → Letter of introduction → Cover letter → Resume → Thank you letter → Job application → Licenses, Certificates and Awards → Transcripts → Letters or Recommendation → Work Samples	20	5	
7. Technology Literacy ▪ **Apply Industry specific technology** ▪ **Use industry specific software** ▪ **Demonstrate keyboarding** ▪ **Accessing information** ▪ **Lifelong enhancement of Technology skills**	**7. Understand and adapt to changing technology.** ▪ Identify and demonstrate use of appropriate technology ▪ Identify and use industry specific software ▪ Demonstrate proficiency in alphanumeric keyboarding ▪ Input and retrieve information ▪ Understand the importance of lifelong learning in adapting to changing technology	30	5	