San Bernardino Valley College
Curriculum Approved: November 8, 2004

I.   COURSE INFORMATION:
A. Division: Technical
    Department: Electricity/Electronics
    Course ID: ELECTR 280B
    Course Title: Mini Computer Operation and Maintenance
    Units: 4
    Lecture: 3 hours
    Laboratory: 3 hours
    Prerequisite: ELECTR 266
    Corequisite: None
    Dept. Advisory: None

B. Catalog Description: Provides technicians and engineers with a working knowledge of the principles and analysis techniques applicable to computer operations and maintenance. Includes the theory and experience necessary to understand and analyze computer circuitry as needed for entry-level work in the computer and electronics industry.

C. Schedule Description: Provides technicians and engineers with a working knowledge of the principles and analysis techniques applicable to computer operations and maintenance.

II.   NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES:
Upon successful completion of the course, the student should be able to:
A. Identify the major components and assemblies of a computer system, motherboards, video cards, memory, power supplies, etc.
B. Explore and define problems associated with the major components and assemblies of a computer system.
C. Analyze and explain computer hardware and software malfunctions through the use of systematic trouble-shooting techniques.
D. Identify the different types of memory.
E. Work with both software and hardware diagnostics.
F. Install and configure components.
G. Connect and install local area networks.

IV. COURSE CONTENT:
A. Personal Computer Background
    1. Personal computing history
    2. IBM
    3. IBM compatible
B. Overview of System Features and Components
    1. Types of systems
    2. Documentation
C. System Teardown and Inspection
    1. Using the proper tools
    2. Using the proper test equipment
    3. Wrap plugs
    4. Hardware
    5. Disassembly procedures
D. Motherboards
    1. Replacement of
    2. Knowing what to look for
    3. Motherboard form factors

E. Bus Slots and I/O Cards
1. Bus
2. Expansion slots
3. Types of I/O buses
4. Resolving resource conflicts
F. Microprocessor Types
1. Processor specifications
2. Intel processors
3. IBM
4. Math coprocessors
5. Processor tests
G. Memory
1. Memory layout
2. Physical memory
3. Upgrading by increasing memory
4. Adding motherboard memory
5. Upgrading ROM BIOS
H. Power Supply
1. Function and operation
2. Energy star systems
3. Problems
4. Repairing
I. Input Devices
1. Keyboards
2. Mice
3. Joystick
J. Video Hardware
1. Monitors
2. Video cards
3. Troubleshooting
K. Communications and Networking
1. Serial ports
2. Parallel ports
3. LAN
L. Audio Hardware
1. Sound card applications
2. Sound card characteristics
3. Sound card options
4. Sound card installation
M. Floppy Disk Drives and Controllers
1. Drive components
2. Types of drives
3. Disk construction
4. Drive installation procedures
5. Troubleshooting
N. Hard Disk Drives and Controllers
1. Hard disk drive components
2. Hard disk features
O. Hard Disk Interfaces
1. ESDI
2. IDE
3. SCSI
P. Hard Disk Drive Installation
1. Procedures
2. Troubleshooting

    Q. CD-ROMS
       1. CD formats
       2. Installing your drive
    R. Software and Hardware Diagnostic Tools
       1. POST
       2. IBM
       3. Disk diagnostics
    S. Troubleshooting

V. METHODS OF INSTRUCTION: (Please check all that apply and add any additional not listed.)

X Lecture
X Class and/or small group discussion
_____ Critical evaluation of texts, newspapers, journal articles, and other printed research
_____ Critical evaluation of films, videotapes, audiotapes, or other media forms
X Classroom demonstrations
_____ Field trips
_____ Guest speakers
X Other: Practical labs with PC repair and installation
_____ Other:
_____ Other:

VI. TYPICAL OUT-OF-CLASS ASSIGNMENTS:

A. <u>Reading Assignment.</u> Reading assignments are required and may include (but are not limited to) the following: After reading the chapter on Microprocessor Types, discuss in small groups the processor specifications.

B. <u>Writing Assignment.</u> Writing assignments are required and may include (but are not limited to) the following: Questions involving written responses and problem solving
    Typical Questions:
    1. How do the new generation of Cyrix and AMD microprocessors compare to the Intel series microprocessors? What features are standard and what unique features do they have?
    2. What are the five basic steps to install an IDE hard disk drive into an AT class IBM compatible PC? What special considerations are there for the size of the drive versus the PC Bios revision?
    3. List all system resources (physical, mechanical, and electrical) you would need to have available to install a multimedia upgrade kit. Includes sound cards, speakers, and CD-ROM drives.

C. <u>Critical Thinking Assignment.</u> Critical thinking assignments are required and may include (but are not limited to) the following: Practical labs with written conclusions
    Typical Labs:
    1. Install and configure components.
    2. Connect and install local area networks.

VII. EVALUATION:

A student's grade will be based on multiple measures of performance and will reflect the objectives explained above. A final grade of "C" or better should indicate that the student has the ability to successfully apply the principles and techniques taught in this course. These evaluation methods may include, but are not limited to, the following (Please check all that apply, and add additional ones not listed):

_____ Portfolios
X Projects
X Written papers or reports
_____ Presentations (oral and visual)
_____ Work performance (internships or field work)

        X Lab work
        X Comprehensive examinations (cumulative finals or certifications)
        _____ Peer evaluation
        _____ Self evaluation
        _____ Classroom participation
        _____ Homework
        _____ Other:
        _____ Other:
        _____ Other:

VIII.   **TYPICAL TEXTS:**
    A. Mueller, Scott, Upgrading and Repairing PCs, Que, Illinois, 2004
    B. Brooks, C., A+ Certification, Prentice Hall, New Jersey, 2003
    C. Asser, S., Microcomputer Theory and Servicing, Prentice Hall, New Jersey, 2001

IX.   **OTHER SUPPLIES REQUIRED OF STUDENTS:**
    Scientific calculator

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PREREQUISITE/COREQUISITE/ADVISORY
COURSE GRID FORM

Target Course: ELECTR 280B Mini Computer Operation and Maintenance

Prerequisite Course: ELECTR 266   Microprocessor Technology

Instructions:
1)   List exit competencies (skills) from Prerequisite Course. These skills are listed in the "Student Outcomes" section of the Course Outline ("upon completion of the course, the student should be able to…")
2)   Indicate which of the listed exit competencies (skills) are necessary entry skills needed for success in the target course. Mark with an "X" each needed skill.
3)   Indicate the degree of importance of each needed entry skill for course success, using the following rating scale:

1=Critical   2=Very Helpful   3=Desirable

Skills Analysis

Entry Skills in Target Course	Exit Skills Provided by Prerequisite Course (Mark with an X if needed and indicate Prerequisite Course if more than one).	Degree of Importance (Rate 1 – 3)
1. Respond to the terminology used in microprocessors.	X	1
2. Interpret stack functions, addressing, logic instructions and register functions.	X	1
3. Explain different support chips used for timing and memory.	X	2
4. Explain the purpose of the microprocessor as applied to computer technology.	X	1
5. Construct various microprocessor circuits and interface circuits to specifications.	X	1
6. Explain the operation of various microprocessor circuits.	X	2
7. Describe the purpose and function of peripheral devices.	X	1
8. Analyze waveforms at various points in microprocessor circuits.	X	2
9. Troubleshoot microprocessor circuits.	X	1