

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY  
SAULT STE MARIE, ON



COURSE OUTLINE

Course Title: Computer Hardware-II

Code No.: CST101 Semester: 2

Program: Computer Engineering Technology,  
Computer Network Technology,  
Computer System Support Technology,  
Computer Programming.

Author: Fred Carella / Bazlur Rasheed / Cindy Trainor

Date: January, 2000 Previous Outline Date: January, 1999

Approved: \_\_\_\_\_  
Dean Date

Total Credits: 4 Prerequisite(s): None

Length of Course: 4 hours/week Total Credit Hours: 64

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## **I. COURSE DESCRIPTION:**

This course introduces the student to PC hardware components, concepts, maintenance, basic troubleshooting, DOS and Windows 3.1 from an installation/maintenance point of view. The areas of study include microprocessors, memory organization, busses and common computer subsystems, storage and other peripherals. The theory is reinforced and practical skills are developed with hands on lab exercises, which include assembly, disassembly, basic configuration and troubleshooting of PC systems, installation of DOS and Windows 3.1. This course is one of a number of courses that prepare the students for A+ certification.

## **II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

Upon successful completion of this course the student will demonstrate the ability to:

### **A. Disassemble and Assemble a PC.**

*Potential Elements of the Performance:*

1. Identify and describe the role of all system components.
2. Identify and describe the difference between the different system types (AT, XT...).
3. Use various tools and procedures in the process of assembling and disassembling PC systems.
4. Discuss the application of various chemicals in the cleaning and assembling PC systems.
5. Apply safe handling methods in the assembly and disassembly of PC's and peripheral components.
6. Discuss the dangers of static electricity and to apply precautions against it.
7. Identify high voltage areas and practice safe handling in those areas.
8. Discuss and apply pre-disassembly precautions such as carefully documenting the system state and gathering all relevant documentation and sources of that documentation.

### **B. Identify and Describe Computer Subsystems.**

*Potential Elements of the Performance:*

1. Discuss the "input/process/output" model of a computer system as it relates to the PC.
2. Identify and discuss the merits of the various microprocessors available for PC systems.
3. Identify and discuss the role of various computer busses such as VESA, PCI, 8-bit and 16 bit ISA, EISA, MCA, etc....
4. Identify the various memories available including SIMMs, SIPPs, EDO, SD and to discuss the differences between them.
5. Discuss the role of the memory subsystem and to distinguish between memory types such as conventional, extended, expanded, HIMEM, UMA , BIOS, video RAM and cache RAM.
6. Discuss the memory map and its evolution and to relate the map to the I/O subsystem, BIOS, cache and virtual memory.

### **C. Install, Configure and Contrast Computer Storage (Floppy/Hard Drives).**

*Potential Elements of the Performance:*

1. Identify and install floppy disk drive.
2. Identify and install hard disk drive.
3. Discuss the process of installing CD-ROMS and the drivers.
4. Identify the various peripheral interface cables for IDE, E-IDE, SCSI, serial, parallel.

**D. Identify and Describe Computer Peripherals (input/output).**

*Potential Elements of the Performance:*

1. Discuss the process of installing new I/O peripherals including sound cards and their drivers.
2. Identify configuration issues and apply the setting of the IRQ, DMA and Base Addresses in the resolution of device conflicts.
3. Identify the various peripheral port connectors.
4. Identify and discuss the various video subsystems available for the PC.
5. Identify and discuss the merits of various printer technologies.

**E. Install Operating System.**

*Potential Elements of the Performance:*

1. Install a DOS operating system and understand the difference between a full install, an upgrade and apply preinstall procedures such as backups.
2. Understand and be able to discuss the following operating system structures and how they are created and to apply that understanding in the lab environment:
  - The Boot Process,
  - FAT,
  - Master Partition Boot Sector,
  - Directories,
  - DOS Volume Boot Sector
  - Partitions
  - System files required for boot
3. Use and apply the following DOS commands and facilities within the context of maintenance and installation procedures:
  - FDISK
  - SCANDISK
  - MSD
  - MODE
  - DOUBLESPEACE/DRIVESPACE
  - MEMMAKER
  - FORMAT/S
  - COPY CON
  - INTERLNK
  - BACKUP

AUTOEXEC.BAT file -->  
LH  
SET  
PATH  
APPEND  
DEVICE DRIVERS  
CONFIG.SYS file -->  
DEVICE DRIVERS  
DEVICEHIGH  
HIMEM, EMM386  
RAMDRIVE  
SMARTDRIVE

4. Install Windows 3.1 operating system in view of device management.

#### **F. Troubleshoot and Maintenance of PC.**

*Potential Elements of the Performance:*

1. Discuss and apply several diagnostic programs to the maintenance and troubleshooting of hard disk drives, motherboard and device conflicts.
2. Be aware of and to apply various anti virus software to the prevention and spread of viruses.
3. Describe the care and maintenance of laser printers and their components.

#### **III. TOPICS:**

1. How Computers Work - An Overview
2. Model of a computer system - input/process/output/memory/storage  
Computer subsystems including the CPU, local and I/O busses, memory and peripherals.
3. PC assembly and disassembly.
4. Operating system (DOS, Windows3.1 & Windows95) installation from a maintenance technician's point of view.
5. Software diagnostic tools, troubleshooting and maintenance

#### **IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

1. Screwdrivers:  
1 small head Philips,  
1 medium head Philips  
1 small flat head screwdriver
2. Pliers:  
1 Nose pliers,

**3. Text Book:**

Upgrading and repairing PCs, 11th edition, by- Scott Mueller, QUE.  
Upgrading and repairing PCs, A+ Certification Study Guide, by- Scott Mueller  
and Scott Berkel, QUE.

**V. EVALUATION PROCESS/GRADING SYSTEM:**

3 Theory tests (20% each)	60%
Lab work, Quizzes, Practical Tests and Assignments	40%

(The percentages shown above may have to be adjusted to accurately evaluate student skills. Students will be notified of any changes made.)

**Grading Scheme:**

A+	90 - 100%
A	80 - 89%
B	70 - 79%
C	60 - 69%
R	Repeat
X	Incomplete

**Labs:**

Lab activities represent a very important component of this course in which practical 'hands-on' skills will be developed. Because of this, attendance is mandatory and the satisfactory completion of all lab activities is required. Evaluation of lab work in-class will be done. It is the student's responsibility to discuss absences from regularly scheduled labs with the instructor so that alternate arrangements (where possible) can be made to complete the lab requirements.

**Attendance:**

Attendance is mandatory. Absenteeism will affect a student's ability to succeed in this course. Absences due to medical or other unavoidable circumstances should be discussed with the instructor, so that remedial activities can be scheduled. Absenteeism for tests can only be allowed for medical reasons and should be authorized ahead of time. Unauthorized absences could result in a zero grade being assigned.

## VI. SPECIAL NOTES:

### 1. Special Needs

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs Office, Room E1204, Ext. 493, 717, 491 so that support services can be arranged for you.

### 2. Retention of Course Outlines

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other post-secondary institutions.

3. In order to pass this course the student must obtain an overall **test** average of 60% or better, as well as, an overall **assignment** average of 60%.
4. Assignments must be submitted by the due date according to the specifications of the instructor. Late assignments will normally be given a mark of zero. Late assignments will only be marked at the discretion of the instructor in cases where there were extenuating circumstances. Attendance in the lectures and labs is mandatory.
5. The instructor reserves the right to modify the assessment process to meet any changing needs of the class. Consultation with the class will be done prior to any changes.
6. The method of upgrading an incomplete grade is at the discretion of the instructor, and may consist of such things as make-up work, rewriting tests, and comprehensive examinations.
7. Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.

## VII. PRIOR LEARNING ASSESSMENT

Students who wish to apply for advanced credit in the course should consult the instructor.