

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: **COMPUTER HARDWARE I**

Code No.: **CST-101** Semester: **2**

Program: **Computer Engineering / Computer Programming**

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Date: **JANUARY, 1998** Previous Outline Dated: **JANUARY 1997**

APPROVED:

Dean

Date

TOTAL CREDITS: 60

PREREQUISITES: None

I. PHILOSOPHY/GOALS:

This course introduces the student to PC system hardware components, concepts, maintenance and basic troubleshooting. The areas of study include microprocessors, memory organization, peripherals, busses and common computer subsystems. 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.

II. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES):

Upon successful completion of this course the student will be able to:

- 1) Discuss the various fundamental concepts upon which today's PC systems are designed and be able to apply those concepts to the troubleshooting of current and future PC hardware systems.
- 2) Assemble and disassemble a PC system.
- 3) Install and configure operating system and application software.
- 4) Install and identify various peripheral interfaces including serial, parallel, game, hard drive, floppy and other mass storage devices.

III. TOPICS TO BE COVERED:

- 1) Operating system installation, and DOS from a maintenance technicians point of view.
- 2) PC assembly and disassembly.
- 3) Computer subsystems including the CPU, local and I/O busses, memory and peripherals.
- 4) Software diagnostic tools, troubleshooting and maintenance

IV. LEARNING ACTIVITIES:

BLOCK I - Operating System Installation

Upon successful completion of this block the student will be able to:

- 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:

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

BLOCK II - PC Assembly and disassembly

Upon successful completion of this block the student will be able to:

- 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.

BLOCK III - Computer Subsystems and Peripherals

Upon successful completion of this block the student will be able to:

- 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 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.
- 7) Identify and install various mass storage devices including floppy and hard disk drives.
- 8) Discuss the process of installing new I/O peripherals including sound cards, CD-ROMS, multi I/O cards and their drivers.
- 9) Identify the various peripheral interface cables for IDE, E-IDE, SCSI, serial, parallel, ST506/412 and be able to install devices using these interfaces.
- 10) Identify configuration issues and apply the setting of the IRQ, DMA and Base Addresses in the resolution of device conflicts.
- 11) Identify the various peripheral port connectors.
- 12) Identify and discuss the various video subsystems available for the PC subsystems.
- 13) Identify and discuss the merits of various printer technologies.

- 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.

V. METHOD OF EVALUATION

3 THEORY TESTS (20% each) 60%

LAB WORK 25%

QUIZZES AND PRACTICAL TESTS 15%

(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	55 - 69%
I	Incomplete
R	Repeat

UPGRADING OF INCOMPLETES

When a student's course work is incomplete or final grade is below 55%, there is the possibility of upgrading to a pass when a student meets the following criteria:

1. The student's attendance has been satisfactory.
2. The student has not failed all of the theory tests.
3. The student has made reasonable efforts to participate in class and complete assignments.

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. PRIOR LEARNING ASSESSMENT

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

VII. REQUIRED STUDENT RESOURCES

- 1) Screwdrivers:
 - 1 small head philips,
 - 1 medium head philips
 - 1 small head slotted screwdriver

VIII. ADDITIONAL RESOURCE MATERIALS AVAILABLE

- 1) The internet. Various sources will be cited in class

IX. SPECIAL NOTES:

1. In order to pass this course the student must obtain an overall **test** average of 55% or better, as well as, an overall **assignment** average of 55%.
2. 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.
3. 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.
4. 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.
5. Students with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.
6. Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.