

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: COMPUTER HARDWARE I

Code No.: CST-100 Semester: 1

Program: Computer Engineering / Computer Programming

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Date: SEPT, 1995 Previous Outline Dated: _____

APPROVED: _____

Dean

Date

COMPUTER HARDWARE I
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TOTAL CREDITS: 4

PREREQUISITES: None

I. PHILOSOPHY/GOALS:

This course develops awareness of basic electrical, electronic and microprocessor fundamentals essential to the understanding of computer hardware. Emphasis is placed on the basics of electrical measurement and devices, digital electronics and microcomputer architecture. Practical lab exercises develop hands-on skills.

II. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES):

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

- 1) Discuss and utilize fundamental Electrical/Electronic concepts at a level sufficient to allow them to progress to computer hardware maintenance courses.
- 2) Use electronic test equipment to test simple electrical/electronic and digital logic circuits.
- 3) Describe the operation of basic logic circuits and analyze and test simple combinational circuits.

III. TOPICS TO BE COVERED:

- 1) Electrical and Electronic Fundamentals
- 2) Digital Electronics
- 3) Microprocessor Systems

IV. LEARNING ACTIVITIES:

BLOCK I - Electrical & Electronic Fundamentals

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

- 1) Define or describe the meaning of the following terms:
Potential, potential difference, voltage, current, resistance,

COMPUTER HARDWARE I
COURSE NAME

CST100
CODE NO.

- power, conductance, insulator, resistor, capacitor, inductor, transformer, capacitance, inductance, impedance, direct current, alternating current, amplitude, frequency, period, sine wave, square wave, triangular wave, Ohm's law, Kirchoff's law.
- 2) Use Ohm's law and Kirchoff's law to analyze simple series and parallel circuits.
 - 3) Use a digital multimeter to measure voltage, resistance and current and calculate power dissipation in simple DC circuits.
 - 4) Use an oscilloscope to measure the amplitude, frequency and period of periodic waveforms.
 - 5) Use power supplies, function generators and test equipment to analyze simple AC and DC circuit operation.
 - 6) Describe the characteristics of inductors and capacitors in DC and AC circuits.
 - 7) Describe the characteristics of diodes, BJT's (transistors) and LEDs (light emitting diodes).

BLOCK II - Digital Electronics

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

- 1) Produce the symbols and truth tables for inverters, AND, OR, NAND, NOR and Exclusive OR gates.
- 2) Given a simple combinational logic circuit, develop the truth table.
- 3) Explain Demorgan's theorem and give simple examples.
- 4) Describe the operation of a 2 bit adding circuit.
- 5) Discuss the uses of combinational logic in terms of adders and decoders and data selectors.
- 6) Discuss the concept of the flip flop, its applications and describe the operation of a D Type Flip-flop.

BLOCK III - The Microprocessor System

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

- 1) Describe the basic organization of typical microcomputer systems as implemented with address, data and control busses.

COMPUTER HARDWARE I
COURSE NAME

CST100
CODE NO.

- 2) Identify the typical Input/Output devices in an example system.
- 3) Draw a simple Microprocessor block diagram indicating the ALU, Registers, Bus Interface.

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 students 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.

COMPUTER HARDWARE I
COURSE NAME

CST100
CODE NO.

ATTENDANCE:

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 ASSESMENT

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

VII. REQUIRED STUDENT RESOURCES

- 1) Student LAB Package
- 2) Course Handout notes.

VIII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY

- 1) Electric Circuits Fundamentals by Floyd.
- 2) Electronics Fundamentals by Floyd.
- 3) Digital Systems: Principles and Applications by R.J. Tocci

IX. SPECIAL NOTES:

- 1) Students with special needs (eg. physical limitations, visual or hearing impairments, or learning disabilities) are encouraged to discuss any required accommodations confidentially with the instructor.
- 2) Your instructor reserves the right to modify the course as deemed necessary to meet the needs of students or take advantage of new or different learning opportunities.

