SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: **COMPUTER HARDWARE I**

Code No.:   **CST100**   *Semester:*   **1**

Program: **COMPUTER ENGINEERING**
COMPUTER PROGRAMMER
COMPUTER SYSTEM SUPPORT
COMPUTER NETWORKS

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Date: **JUNE 1999**   *Previous Outline Dated*: **AUGUST 1998**

APPROVED: _____   ___
                          Dean   **Date**

TOTAL CREDITS: **4**

PREREQUISITES:

LENGTH OF COURSE: **4 Hours/Week**   **Total Credit Hours:**   **60**

Computer Hardware I   CST100
COURSE NAME   *CODE NO.*

I.   COURSE DESCRIPTION:

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.   LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

A.   Learning outcomes:

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.

4)   Describe the major components of a typical Microprocessor system

5)   Utilize soldering tools to complete basic soldering tasks.

Learning Outcomes and Elements of the Performance:

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

1.   Discuss and utilize fundamental Electrical/Electronic concepts at a level sufficient to allow them to progress to computer hardware maintenance courses.

Potential Elements of the Performance:

- Define or describe the meaning of the following terms: Potential, potential difference, voltage, current, resistance, 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.
- Use Ohm's law and Kirchoff's law to analyze simple series and parallel circuits.
- Describe the characteristics of inductors and capacitors in DC and AC circuits.
- Describe the characteristics of diodes, BJT's (transistors) and LEDs (light emitting diodes)

2.   Use electronic test equipment to test simple electrical/electronic and digital logic circuits.

Potential Elements of the Performance:

- Use a digital multimeter to measure voltage, resistance and current and calculate power dissipation in simple DC circuits
- Use an oscilloscope to measure the amplitude, frequency and period of periodic waveforms.
- Use power supplies, function generators and test equipment to analyze simple AC and DC circuit operation.

3.   Describe the operation of basic logic circuits and analyze and test simple combinational circuits.

Potential Elements of the Performance:

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

4.   Describe the major components of a typical microprocessor system.

Potential Elements of the Performance:
- Describe the basic organization of typical microcomputer systems as implemented with address, data and control busses.
- Identify the typical Input/Output devices in an example system.
- Draw a simple Microprocessor block diagram indicating the ALU, Registers, Bus Interface.
- Given a Microprocessor System Board, identify the major components.

5.   Utilize soldering tools to complete simple soldering tasks.

- construct an interface cable given the necessary tools, supplies and schematic

III.   TOPICS TO BE COVERED:

1) Electrical and Electronic Fundamentals

2) Digital Electronics

3) Microprocessor Systems

IV.   REQUIRED STUDENT RESOURCES/TEXTS:

1)   Student Lab Package for CST100 (available at the bookstore).
2)   Introduction to Computer Hardware I (available at the bookstore).

Computer Hardware I   CST100
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V. EVALUATION PROCESS/GRADING SYSTEM:

     3 WRITTEN TESTS   60%
     LAB PROJECTS/ASSIGNMENTS   25%
     QUIZZES/ASSIGNMENTS   15%
(The percentages shown above may vary slightly if circumstances warrant.)

GRADING SYSTEM

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

UPGRADING OF INCOMPLETES

When a student's course work is incomplete or final grade is below 60%, there is the possibility of upgrading to a pass when a student meets all of the following criteria:

1. The students attendance has been satisfactory.
2. An overall average of at least 50% has been achieved.
3. The student has not had a failing grade in all of the theory tests taken.
4. The student has made reasonable efforts to participate in class and complete assignments.

The nature of the upgrading requirements will be determined by the instructor and may involve one or more of the following: completion of existing labs and assignments, completion of additional assignments, re-testing on individual parts of the course or a comprehensive test on the entire course.

LABS:

Lab activities represent a very important component of this course. Because of this, **attendance is mandatory** and the evaluation of all lab work will be done in class. *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:

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.

VI. SPECIAL NOTES:

- **Special Needs**

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 and/or contact the Special Needs Office so that support services can be arranged.

- **Retention of Course Outlines**

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

- **Course Modifications**

  Your instructor reserves the right to make reasonable modifications to the course as deemed necessary to meet the needs of students or take advantage of new or different learning opportunities.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced standing in the course should consult the instructor. This course is not eligible for challenge at the present time.

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