

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



Sault College

**COURSE OUTLINE**

**COURSE TITLE:** Computer Hardware - I

**CODE NO. :** CST100 **SEMESTER:** 1

**PROGRAM:** Computer Engineering Technology,  
Computer Network Technology,  
Computer System Support Technology,  
Computer Programming.

**AUTHOR:** Mark Allemang / Cindy Trainor / Bazlur Rasheed

**DATE:** July, 2001 **PREVIOUS OUTLINE DATED:** June, 2000

**APPROVED:**

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DEAN

\_\_\_\_\_  
DATE

**TOTAL CREDITS:** 5

**PREREQUISITE(S):** None

**HOURS/WEEK:** 4 hours/week

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*For additional information, please contact K. DeRosario  
School of Technology, Engineering & Technical Trades  
(705) 759-2554, Ext. 642*

**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:**

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 basic soldering tasks.

Potential Elements of the Performance:

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

**III. TOPICS:**

1. Electrical and Electronic Fundamentals
2. Digital Electronics
3. Microprocessor Systems

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

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

Additional resource materials available in the college library:

- 1) Principles of Electric Circuits - by Thomas L. Floyd.
- 2) Electronics Fundamentals - by Thomas L. Floyd.
- 3) Fundamentals of Electronic Devices - by Ronald J. Tocci.
- 4) Introduction to Electronics: DC/AC Circuits - by Stephen C. Harsany.
- 5) Digital Fundamentals - by Thomas L. Floyd.
- 6) Digital Systems: Principles and Applications by R.J. Tocci

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

4 Written Tests	60%
Lab Projects/Assignments	25%
Quizzes	15%

(The percentages shown above may vary slightly if circumstances warrant.)

The following semester grades will be assigned to students in postsecondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see <i>Policies &amp; Procedures Manual – Deferred Grades and Make-up</i> ).	
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has not been possible for the faculty member to report grades.	

**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 student's 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.*

#### **VI. SPECIAL NOTES:**

##### Special Needs:

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

##### 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 postsecondary institutions.

##### Plagiarism:

Students should refer to the definition of "academic dishonesty" in *Student Rights and Responsibilities*. Students who engage in "academic dishonesty" will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course outline amendments:

The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

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.

**VII. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

**VIII. DIRECT CREDIT TRANSFERS:**

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.