SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: **HARDWARE APPLICATIONS DEVELOPMENT**

Code No.: **CST-300**   Semester: **6**

Program: Computer Engineering / Computer Programming

Author: FRED CARELLA

Date: JANUARY,1998   Previous Outline Dated: none

APPROVED:

            Dean   Date

TOTAL CREDITS: 60

PREREQUISITES: CST201, CSD305

I. PHILOSOPHY/GOALS:

This course continues the students study of advanced hardware systems. Previous hardware courses emphasize the study of general PC hardware systems. This course will continue that study, focusing on new hardware developments in the WinTel architectures as well as delving deeper into hardware mechanisms that the student may already be familiar with. In addition to the WinTel architectures, this course will broaden the students view of hardware systems by studying other hardware solutions including embedded controllers from various manufacturers: in particular, controllers from Motorola, Microchip and Intel will be studied. Hands on, hardware system projects will be assigned to exercise the students ability to work with medium size hardware systems. This course will develop the students abilty to integrate and apply various hardware/software platforms to the solution of a problem.

II. STUDENT PERFORMANCE OBJECTIVES (OUTCOMES):

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

1.   Discuss and apply recent advancements in the WinTel hardware/software architectures.

2.   Study and modify a reasonably complex hardware system.

3.   Write technical reports on complex hardware systems.

4.   Write reasonably complex software to control hardware systems.

5.   Discuss new hardware technologies.

III. TOPICS TO BE COVERED:

1. The WinTel architecture.

2. Other computer architectures such as microcontrollers and PLC's.

3. Study various complex systems including a weather station and, depending on permission, new industrial processes in place in the community.

4. Writing software to control hardware under various operating systems and hardware environments.

IV. LEARNING ACTIVITIES:

BLOCK I - The WinTel Architecture.

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

1. Discuss and apply various features of the WinTel architecture including:
   * new motherboard chipsets
   * new I/O standards (for example USB)
   * AGP, UltraDMA, MMX etc...

BLOCK II - Embedded Microcontrollers and PLC's

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

1. Draw a block diagram of a typical embedded microcontroller system.

2. Discuss the role of Microcontrollers and PLC's in hardware systems.

3. Write simple software for a microcontroller based system, in particular a Motorola 6811.

BLOCK III - Complex Systems

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

- Discuss, describe and where possible, modify reasonably complex hardware systems. The specific hardware systems will vary from year to year and will be discussed in detail in class.

Block IV - Write software to control hardware systems

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

1. Write software in the Windows 95 environment to control hardware. In particular, the student will:
   - write software to control the serial and parallel port
   - write multithreaded code

2. Write software in the Unix environment, in particular communicate via the serial and parallel ports.

V. METHOD OF EVALUATION

THEORY TESTS	60%
LABS and LAB REPORTS	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	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.

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

TEXTBOOK: none.
The primary resource will be the internet and instructor supplied notes.

VIII. 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.