

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE NAME: COMPUTER INTERFACING
CODE NO.: ELN302
PROGRAM: ELECTRONIC/ELECTRICAL TECHNOLOGIST
SEMESTER: SIX
DATE: APRIL 1997
AUTHOR: DOUG FAGGETTER

NEW: _____

REV: A

APPROVED:

Bill Armstrong

COORDINATOR

April 18, 1997

DATE

[Signature]

DEAN

APRIL 21, 1997

DATE

COURSE NAME

CODE NO.

COMPUTER INTERFACING

ELN302

PREREQUISITES: CET127, CET228, CET331

PHILOSOPHY/GOALS:

STUDENTS WILL STUDY THE ARCHITECTURE AND PROGRAMMING OF MICROCONTROLLERS IN COMPUTER INTERFACING APPLICATIONS. LAB ACTIVITIES INVOLVING COMPUTER INTERFACING TO HARDWARE AND THE ASSOCIATED SOFTWARE REQUIREMENTS WILL SUPPORT THE THEORY.

STUDENT PERFORMANCE OBJECTIVES:

UPON SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENT WILL BE ABLE TO:

1. IDENTIFY THE MAJOR COMPONENTS IN THE ARCHITECTURE OF A MICROCONTROLLER.
2. IDENTIFY THE FUNCTION OF THE VARIOUS REGISTERS IN THE MICROCONTROLLER.
3. BE ABLE TO USE THE INSTRUCTION SET OF THE MICROCONTROLLER TO WRITE ASSEMBLY LANGUAGE PROGRAMS.
4. USE THE ON-BOARD MONITOR PROGRAM OF THE MICROCONTROLLER.
5. INTERFACE ANALOG SIGNALS TO THE MICROCONTROLLER.
6. ACCESS THE MICROCONTROLLER PERIPHERALS AND TIMER.
7. PROGRAM THE MICROCONTROLLER USING A HIGH LEVEL LANGUAGE ("C"LANGUAGE).

COURSE NAME

CODE NO.

COMPUTER INTERFACING

ELN302

TOPICS TO BE COVERED

1. M68HC11 MICROCONTROLLER
2. M68HC11 REGISTERS
3. M68HC11 ADDRESSING MODES
4. M68HC11 INSTRUCTION SET
5. EVB MONITOR COMMANDS
6. ASSEMBLER DIRECTIVES
7. INTERFACING ANALOG SIGNALS
8. OUTPUT PERIPHERALS

REQUIRED TEXTBOOK:

DATA ACQUISITION AND PROCESS CONTROL WITH THE M68HC11
MICROCONTROLLER
BY- DRISCOLL, COUGHLIN, VILLANUCCI
(MACMILLAN PUBLISHING CO. 1994)

COURSE NAME

CODE NO.

COMPUTER INTERFACING

ELN302

LEARNING ACTIVITIES	REQUIRED RESOURCES
1 <u>M68HC11 MICROCONTROLLER</u> 1.1 M68HC11 FAMILY 1.2 PACKAGE STYLE AND PIN ASSIGNMENTS 1.3 PORT REPLACEMENT UNIT 1.4 MEMORY MAP	TEXT CHAP 1
2 <u>M68HC11 PROGRAMMER'S MODEL AND ADDRESSING MODES</u> 2.1 ACCUMULATOR A AND B 2.2 ACCUMULATOR D 2.3 CONDITION CODE REGISTER 2.4 INDEX REGISTERS 2.5 STACK POINTER 2.6 PROGRAM COUNTER 2.7 ADDRESSING MODES 2.8 INTERRUPTS	TEXT CHAP 2
3 <u>M68HC11 INSTRUCTION SET</u> 3.1 LOAD, STORE, TRANSFER AND EXCHANGE DATA 3.2 ARITHMETIC INSTRUCTIONS 3.3 MULTIPLY AND DIVIDE INSTRUCTIONS 3.4 LOGICAL OPERATION INSTRUCTIONS 3.5 DATA TESTING AND BIT MANIPULATION INSTRUCTIONS 3.6 SHIFT AND ROTATE INSTRUCTIONS 3.7 CONDITION CODE INSTRUCTIONS 3.8 BRANCH INSTRUCTIONS 3.9 JUMP INSTRUCTIONS 3.10 SUBROUTINE CALLS AND RETURNS 3.11 STACK POINTER AND INDEX REGISTER INSTRUCTIONS 3.12 INTERRUPT HANDLING INSTRUCTIONS	TEXT CHAP 3
4 <u>EVB COMMANDS, UTILITY ROUTINES AND ASSEMBLER SOFTWARE</u> 4.1 MONITOR COMMANDS 4.2 ASSEMBLER DIRECTIVES 4.3 SOURCE AND ASSEMBLER FILES 4.4 DOWNLOADING FILES	TEXT CHAP 4

COURSE NAME

CODE NO.

COMPUTER INTERFACING

ELN302

5 INTERFACING ANALOG SIGNALS TO THE M68HC11 TEXT CHAP 5 5.1
 ANALOG TO DIGITAL CONVERTERS

- 5.1 PORT E
- 5.2 A/D REGISTERS
- 5.3 ANALOG INTERFACE

6 OUTPUT PERIPHERALS AND SOFTWARE CONTROL TEXT CHAP 6

- 6.1 I/O PORTS
- 6.2 TIMER
- 6.3 TIMER OVER FLOW
- 6.4 OUTPUT COMPARE FUNCTIONS
- 6.5 INPUT CAPTURE FUNCTIONS

7 OTHER INTERFACING APPLICATIONS

- 7.1 USE OF THE "C" COMPILER TO PROGRAM THE
 MICROCOMPUTER
- 7.2 68000 APPLICATIONS
- 7.3 IEEE 488 BUS
- 7.4 PROGRAMING THE PARALLEL PORT OF THE IBM PC

EVALUATION PROCEDURES

1. TESTING WILL CONSIST OF BOTH THEORY AND PRACTICAL COMPONENTS.
AT LEAST ONE WEEK NOTICE WILL BE GIVEN FOR ALL MAJOR TESTS.
2. QUIZZES MAY BE GIVEN FROM TIME TO TIME WITHOUT NOTICE.
3. THE GRADING WEIGHT WILL BE:

THEORY	-	50%
LAB	-	50%

TOTAL	-	100%

4. THE GRADING SYSTEM WILL BE AS FOLLOWS:

A+	=	90	-	100%
A	=	80	-	90%
B	=	70	-	79%
C	=	55	-	69%
R	=	REPEAT		

5. THE STUDENT MUST ATTAIN A 55% IN BOTH THEORY AND LAB PORTIONS TO SUCCESSFULLY COMPLETE THE COURSE.

SPECIAL NOTES:

1. LAB ATTENDANCE IS COMPULSORY AND IS INCLUDED IN THE EVALUATION PROCESS.
2. THE INSTRUCTOR RESERVES THE RIGHT TO MODIFY THE COURSE TO MEET THE NEEDS OF THE STUDENTS.