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

COURSE OUTLINE

COURSE TITLE: MECHANICAL SYSTEMS ANALYSIS

CODE NO.: MCH316 _^^^^_

PROGRAM: MECHANICAL ENGINEERING TECHNOLOGY

SEMESTER: SIXTH

AUTHOR: Dan Grand

DATE: December 1992

PREVIOUS: Nov 1991

APPROVED: -/^ (^V^-^-- ^ - / ^ ^ ^ ^
CHAIRPERSON/) DATE

MECHANICAL SYSTEM ANALYSIS MCH316
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PREREQUISITE(S): Must have successfully completed process control {MCH315) and Introduction to Computers (CET100) or equivalent.

I. PHILOSOPHY/GOALS

It is the intent of this course to give the students an appreciation for and hands on lab experience with the use and the function of PLC's within the current industries.

I!. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course, the student will be able to demonstrate the following attitudinai/inherent and PLC/technical skills:

ATT1TUDINAL/INHERENT SKILLS:

The student will be able to:

- make clean, careful, meticulous notes, assignments and records
- demonstrate punctual, industrious attendance
- demonstrate persistence and ability to resolve/identify problems
- organize and plan technical work independently and in small groups.
- communicate clearly in written form
- consult and extract relevant information from MANUALS
- demonstrate patience, teamwork and co-operation.

PLC/TECHNICAL SKILLS:

The student will be able to:

A) PLC HARDWARE: (ON ALL OF THE 085, 884 & 984)

- identify the power supply, I/O modules, rack, slot, processor and communications link between PLC and PC.
- ascertain the modules id #, number of input and outputs, type of input or output on sight.
- locate and interpret the modbus, power and status lights on the above units.
- locate I/O connection pins given the Traffic Cop and l?0 ladder logic address.

B) LADDER LOGIC

- state the direction of power flow
- identify rungs, networks
- identify contacts, coils, timers, counters,
- describe the difference between series and parallel elements
- identify AND, and OR combinations
- distinguish and define addresses, registers, register contents, discrete, decimal, binary, octal, hexadecimal, and bits.
- distinguish between logic mode, ladder mode and documentation.
- state the difference between NC and NO contacts and give an example of use.
- write simple PLC programs using contacts, coils, timers and counters.

C) 884 SOFTWARE

- state difference between on-line and off-line programming.
- state the addressing rules for 884 I/O, timers, and counters.
- and the following:

OFFLINE PROGRAMMING

- select an existing "active PLC"
- create a new "active PLC" in off-line mode.
- Save an "active PLC" onto floppy diskette/hard drive.

EDITING:

- set correct path or active PLC and directories to save/retrieve files onto/from floppy diskettes or hard drive.
- interpret status line at top of screen
- move cursor about on screen and page up or down
- delete or replace an element
- delete or insert a network
- invoke and use the help, del, ins and "f key menus
- invoke and use the edit menu by "?"
- perform a simple search.

ON-LINE PROGRAMMING:

- attach to a PLC.
- start and stop a PLC.
- load an active PLC from floppy diskette/hard drive into the 884.
- monitor the operation of the program resident in the 884.
- modify a program resident in the 884 by on-line programming.
- change from monitor mode to program mode and back again.
- download a program resident in the 884 onto floppy diskette/hard drive.
- set up and save a correct traffic cop.

LOGIC SCREEN:

- invoke logic screen
- set up logic screen to monitor discrete and register data
- enable and disable contacts and coils
- force on and off contacts and coils
- modify register contents
- set up and use logic window in ladder display

D) 085 SOFTWARE

- state the equivalent for traffic cop
- state the addressing rules for 085 I/O, timers and counters
- state the special last line required for monitoring on 085.
- perform all the equivalent on-line/ off-line functions and edit functions of the 884 listed above on the 085.
- state the equivalent of "stop" and "start PLC" for the 085.
- invokes the "operations menu" to change modes for program, change and monitor modes.
- download a program from the 085 processor and save onto floppy diskette/ hard drive.

E) PLC PROGRAMMING

- design, write, debug, execute and document PLC programs on the 884 and 085 to accomplish simple tasks.

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F) PROJECT

- complete a major project on one of the following Fisher Models:

OHCRANE
PROCESS LINE
ROBOT
984/ANALOGUE I/O

- samples of such projects are attached.

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V. METHOD(S) OF EVALUATION

The student will be evaluated by attendance (10%), assignments (15%), i major project(20%), a midterm test based on classroom theory and assignments (25%), and a final test based on the major project(30%). Each test will consist of a theory portion and a laboratory hands on portion.
Note that no rewrites will be given unless the attendance was above 80%.

VI. REQUIRED STUDENT RESOURCES (including textbooks and workbooks)

NONE

AGENDA OF ACTIVITIES:

The course will consist of weekly 3 hours blocks.
During the first half of the course the three hour blocks will be comprised of: I hour of theory and 2 hours of labs.

During the second half of the course the three hours blocks will be comprised mainly of lab work on the assigned project.