SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: PROGRAMMABLE LOGIC CONTROLLERS

Code No.: ELR 239-3

Program: ELECTRICAL/ELECTRONICS TECHNICIAN

Semester: FOUR

Date: AUGUST, 1986

Author: W. FILIPOWICH

New: ____ Revision: X

APPROVED: J.P. Arozietto
Chairperson

Date

PROGRAMMABLE LOGIC CONTROLLERS — Course Name

ELR 239-3 — Course Number

PHILOSOPHY/GOALS:

After course completion, the student should be able to communicate basic Programmable Controller concepts; develop, edit and interpret basic ladder logic diagrams on various PLC family products; troubleshoot the system and operate peripheral devices.

METHOD OF ASSESSMENT (GRADING METHOD):

Assessments will consist of major tests and various quizzes for 60% of the overall mark.

Practical tests, lab quizzes, oral and written assignments, and general lab assessment will make up the other 40%.

Grading:

A - 80 to 100% (Outstanding achievement)
B - 66 to 79% (Consistently above average achievement)
C - 55 to 65% (Satisfactory or acceptable achievement)
R - Repeat (Objectives have not been achieved)

TEXTBOOK:

Allen - Bradley PLC 2/15 Manuals

Modicon 484 Manual

Industrial Solid-State Electronics - Maloney

COURSE OUTLINE:

1. Introduction to Programmable Controllers (General)
2. Hardware/System Introduction
3. Memory Concepts and Organization
4. Input/Output (I/O) Addressing
5. Basic Instruction Set and Editing Functions
6. Writing the User (Logic) Program
7. Operating Instructions
8. Industrial Terminal and Keyboard Operation
9. Timer and Counter Instruction Set
10. Data Manipulation and Arithmetic Instructions
11. Troubleshooting of the PLC System and Using the PLC to Troubleshoot the Process.
12. Peripheral Devices
13. Report Generation

SPECIFIC OBJECTIVES:

The student will be able to:

1. Contrast the software logic of a programmable controller to the logic of a hard-wired circuit.
2. Name the three parts of a programmable controller and describe each part's function.
3. Define the following terms associated with the input/output function of a programmable controller: rack, slot, module, and terminal.
4. List the sequence of events in a programmable controller's scan cycle and cite approximate time durations for each event.
5. Define the following terms associated with the processor function of a programmable controller: user-program, instruction-rung, input image table, output image table, and central processing unit.
6. Give a detailed description of the procedure by which the central processing unit executes one instruction-rung.
7. Explain the operation of the three relay-type instructions that are available with a programmable controller, namely: examine-On, examine-Off, and output-energize.
8. Discuss the difference between an output-energize instruction that affects a load device and an output-energize instruction that is solely for internal logic.
9. Describe the following capabilities of a programmable controller: timing, counting, value comparison, and arithmetic.
10. Discuss each of the operating modes of a programmable controller: PROGRAM, TEST, RUN, and RUN/PROG.
11. Given a ladder-logic representation of a user-program, enter that program into memory by typing on the programming device's keyboard.
12. Use the program-editing functions that are on the programming device's keyboard.
13. Use the forcing functions that are on the programming device's keyboard.
14. Given a memory map of the processor and the arrangement of the input/output section, choose appropriate addresses for input devices, output devices, internal-logic instructions, timers, and counters.
15. Hardwire all input and output devices and test and troubleshoot the program for proper operation.
16. Monitor the PLC's via its indicators and monitoring devices.
17. Operate peripheral devices such as cassette tape deck and printers.