MOHAWK VALLEY COMMUNITY COLLEGE

UTICA AND ROME, NEW YORK

COURSE OUTLINE

Industrial Computer Applications

ET246

CATALOG DESCRIPTION:

### ET246 Industrial Computer Applications C-3 P-4 Cr-5

This course introduces hardware and software applications of the personal computer. It covers applications involving interfacing, digital Input/Output, analog Input/Output, data acquisition, and computer control of external electrical devices. Hardware components are studied for an understanding of computer systems, and BASIC is used to write input/output instructions. Experiments include wiring, testing, and debugging of a digital/analog circuit board and trainer. Prerequisite: ET233 Industrial Electronics (Spring semester)

Student learning outcomes:

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

* The student will be able to perform moderately complicated troubleshooting and maintenance of a computer system.
* The student will design and debug pneumatic circuits
* The student will design and debug networks consisting of Allen Bradley PLC’s and HMIs .
* The student will review and understand the need for safety operations when using high voltage applications.
* The student will design a complicated application using pneumatics, networking and HMI’s as a capstone project including formal write-up
* The student will review and understand the Allen Bradley application guide for PLC’s and detail their uses.

DETAILED COURSE OUTLINE:

1. Introduction to Control Logix Hardware (3 periods)

1. Overview
2. Identify different members of the control Logix family
3. Understand available control Logix controllers and their features
4. Identify I/O modules by their part numbers
5. Understanding differences between the modular control Logix and the members of the Compact Logix family
6. Identify control Logix communication modules

# 2. Introduction to RS LOGIX 5000 Software

(3 periods)

1. Identify the major RS Logix 5000 software features
2. Identify RS Logix 5000 toolbars
3. Create and configure a new RS Logix 5000 project
4. Enable automatic project backup and project recovery
5. View and modify controller properties
6. Turn on and customize toolbars
7. Configure the way you want your ladder window to look

# 3. Number Systems (3 periods)

1. Decimal, binary, Octal, hexadecimal numbers
2. Converting from one number system to another
3. New terms associated with control Logix data formatting

4. RS LOGIX 5000 Project Organization (3 periods)

1. Understand task, program, and routine
2. Create a new RS Logix project
3. Create tasks, programs and routines
4. Create a fault routine
5. Modify the program schedule
6. Un-schedule a program
7. Assign a main routine and a fault routine
8. Create subroutines

# 5. Understanding Control LOGIX I/O Addresing

(3 periods)

1. Overview
2. Format of control Logix I/O tags
3. Control Logix and Compact Logix tags
4. Local discrete and analog I/O tags
5. Remote I/O tags on control that were Ethernet IP networks
6. I/O configuration for local and remote control Logix hardware

# 6. MIDTERM 1

7. Compact Logix I/O Configurations (5 periods)

1. Terminology associated with modules and their configuration
2. Digital I/O module configuration for either a 1768 or 1769 compact Logix
3. Analog I/O module configuration for either a 1768 or 1769 compact Logix

8. Communicating Between PC’s and Control Logix (3 periods)

1. Define common communication terms
2. Determine personal computer to PLC communication options
3. Configure the proper communications path for your specific control Logix or compact Logix hardware
4. Download a RS Logix5000 project
5. Put the controller in run mode
6. Check a project for errors
7. Monitor tags

9. Creating & Monitoring RS LOGIX 5000 Tags (3 periods)

1. Base tags
2. Alias tags
3. Assigning tags and datatypes
4. Configuring tags styles
5. Entering a tag description
6. Creating controller scoped tags and programmed scoped tags
7. Controller scoped and programmed scoped tags
8. Control Logix arrays

10. Introduction To LOGIC (3 periods)

1. And/Or/ Not Logic
2. Truth Table
3. Control Logix Boolean Function Blocks

11. Writing Logical Programs (3 periods)

1. Overview
2. Creating Logic for Sensors
3. Input/ Output Connections
4. Simulating programs
5. Debugging Routines
6. Downloading & Ethernet

12. Input Output Modules and Connections (3 periods)

1. Overview
2. Voltage Choices for I/O
3. Relay Connections and Initializations
4. Loads

13. Timers and High Speed Counters (3 periods)

1. Overview
2. Sensing
3. Motor Setup for RPM Measurements
4. Array Setup and Data Measurement
5. Programming Style Differences

14) Controls for Automations (1 period)

1. Overview
2. Sequencing PLC Controls
3. Produced and Consumed Tags
4. Setting Up ControlLogix for Production
5. Trends
6. HMI, Introductions

LABORATORY EXPERIMENTS:

Students should submit technical reports for the laboratory exercises. Appropriate graphs,

tables, and subsequent analysis are expected along with proper spelling and grammar.

1. Safety Procedures, Lab Introduction
2. The AC Motor, Description and End Plate, Introduction to components
3. Ladder Diagrams and first wiring
4. Single Phase start Stop circuit
5. Single Phase start Stop circuit with latching
6. Single Phase start Stop circuit with latching from two locations with latch
7. Timers
8. Photosensors Switches
9. Three Phase Motors
10. Reversing Three Phase Motors
11. Three phase motor circuits from two locations
12. Proximity Switches
13. Frequency drives
14. Advanced Frequency Drives
15. CAT 5 Cables