Introduction to Electrical Motor Controls

CATALOG DESCRIPTION
This course instructs students in the basic fundamentals of electrical motor controls to include hands on operation, maintenance, problem diagnosis, repair and proper usage of tools, schematics and manuals, of industrial equipment to include: DC motors, transformers, AC motors, AC distribution and safety panels. This course will be taught in a hybrid format. Prerequisite of Trade Math or equivalent is required. 30 hours

LEARNING OUTCOMES
Upon completion of this course a student will be able to:
• Explain the main concept of using Electrical Motor Control systems.
• Identify the parts of an Electrical Motor Control system.
• Demonstrate the use of some Electrical Motor Control applications.
• Explain the function of different Electrical Motor Control components and their operation.
• Draw an Electrical Motor Control circuit diagram for some applications.
• Determine the necessary components to be used in certain Electrical Motor Control applications.
• Assemble Electrical Motor Control circuits using different components.
• Troubleshoot some Electrical Motor Control circuit malfunctions.

COURSE OUTLINE
1. Electrical Safety
   a. Importance of the Equipment Ground Connection
   b. Ten Basic Rules of Electrical Safety
   c. Purpose of the Lockout/Tagout System Used in Industry
   d. Devices Used to Disconnect Power to a Circuit
   e. Time-Delay Fuses Used with Motor Starting Circuits
   f. Overcurrent Protection Devices

2. Three-Phase Power and Motors
   a. Describe the Operation of Three-Phase Power
   b. Two Most Common Three-Phase Voltage Systems
   c. Operation of a Three-Phase Motor

3. Manual Motor Control
   a. Functions of Motor Control
   b. Basic Requirements of a Typical Motor Installation
   c. Motor Controller and Motor Starter

   a. Functions of Two Categories of Motor Starters
   b. Function and Operation of Manual Starters
c. Low-Voltage Protection

5. Overload Protection
   a. Types of Overloads
   b. Operation of Thermal Overloads
   c. Operation of a Magnetic Overload

6. Introduction to Transformers
   a. Operation of a Transformer
   b. Turns Ratio and Secondary Voltage
   c. Four Basic Components of an Electrical Control Circuit
   d. Function of a Control Transformer

7. Control Logic
   a. Steps of a Control Process
   b. Operation of Switches and Indicators
   c. Function of a Ladder Diagram
   d. Elements of Control Logic

METHOD OF INSTRUCTION
This hybrid course will be taught using lectures, discussion, hands-on lab sessions and self-study.

COURSE MATERIALS
Text: To be determined