Principles of Engineering Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Unit 3.1 – Machine Control – Study Guide Date \_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_

Concepts

1.     Flowcharts provide a step by step schematic representation of an algorithm or process.

2.     Control systems are designed to provide consistent process control and reliability.

3.     Control system protocols are an established set of commands or functions typically created in a computer programming language.

4.     Closed loop systems use digital and analog sensor feedback to make operational and process decisions.

5.     Open loop systems use programming constants such as time to make operational and process decisions.

Performance Objectives

It is expected that students will:

* Create detailed flow charts that utilize a computer software application.
* Create control system operating programs that utilize computer software.
* Create system control programs that utilize flowchart logic.
* Choose appropriate input and output devices based on the need of a technological system.
* Differentiate between the characteristics of digital and analog devices.
* Judge between open and closed loop systems in order to choose the most appropriate system for a given technological problem.
* Design and create a control system based on given needs and constraints.

Essential Questions

1.     What are the advantages and disadvantages of using programmable logic to control machines versus monitoring and adjusting processes manually?

2.     What are some everyday seemingly simple devices that contain microprocessors, and what function do the devices serve?

3.     What questions must designers ask when solving problems in order to decide between digital or analog systems and between open or closed loop systems?

Vocabulary

Algorithm

Analog Signal

Analog to Digital

Closed Loop System

Data

Digital Signal

Digital to Analog

Electromagnet

Feedback

Flowchart

Input

Interface

Microprocessor

Normally Closed

Normally Open

NTC Resistor

Open Loop System

Output

Photocell

Polarity

Potentiometer

Programmable Logic Controller

Reed Switch

Sensor

Subroutine

Switch

Transistor