

## Hamilton-Juniors lab-off-site learning packet day 4

Instructor Mark Hamilton

Date \_\_\_\_\_

Program/Class AEM JR

### Instructional Objective(s):

#### Materials:

White board

#### Method of Instruction:

Research

#### Activities:

Read through handouts, watch videos and do activities

Answer the questions provided

#### Closure:

Answer questions on the last page

#### Assessment:

Answer sheets will be collected and graded

## Junior lesson 1

### Introduction to CNC code

#### Overview

Computer Numerical Control (CNC) is the process of having a machine controller manage the operation of a machine. This would include the table motions, the [spindle](#) speed, and various other machining functions. This is all accomplished by a [program](#) that is written using NC code. These coded instructions are carefully arranged by using letters (A, B, C, thru Z), numbers (1, 2, 3 thru 9) and symbols (+, -, /...etc.) to create a program. These instructions can range from a few lines for a simple part to many thousands of lines for a complex part. If the cumulative instructions (program) are written correctly it will provide specific guidance on exactly what functions you want the machine to perform, resulting in the production of a quality part. On the other hand, a poorly written program can have disastrous results... scraping parts, destroying tools, and possibly damaging the machine. In extreme cases the operator's own personal safety may be in jeopardy.

#### Introduction to CNC code

##### A Character

The [NC](#) codes are the "language" that is recognized and understood by the CNC machine's [controller](#). This language, like any language, has a specific structure to insure accurate communication. The NC code structure consists of characters, words, blocks, and programs.

There are 9 character types used in CNC programming:

1. **letters A thru Z**
2. **a number or combination of numbers 0 thru 9**
3. **+ plus sign**
4. **- minus sign**
5. **. decimal or period**
6. **: colon**
7. **; semi-colon**
8. **/ slash**
9. **% percent**

Hamilton-Junior lab-off-site learning packet day 4

Questions (Each question is worth 5 points)

1. What do the letters CNC stand for?
2. What operations would a CNC controller manage?
3. What is the coded instruction made up of?
4. What would determine the length of a written program?
5. What will likely be produced from a correctly written program?
6. What could result from a poorly written program?
7. What are the NC codes?
8. What does the NC code structure consist of?
9. How many character types are used in CNC programming?

10. List the 9 characters used in a CNC program.

a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

d. \_\_\_\_\_

e. \_\_\_\_\_

f. \_\_\_\_\_

g. \_\_\_\_\_

h. \_\_\_\_\_

i. \_\_\_\_\_