

MAC 121 INTRODUCTION TO CNC

COURSE DESCRIPTION:

Prerequisites: None

Corequisites: MAC 111

This course introduces the concepts and capabilities of computer numerical control machine tools. Topics include setup, operation, and basic applications. Upon completion, students should be able to explain operator safety, machine protection, data input, program preparation, and program storage. Course Hours Per Week: Class, 2. Semester Hours Credit, 2.

COURSE OBJECTIVES:

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

- a. Identify axis movements of Computer Numerical Control machines.
- b. Define the function of the programming codes.
- c. Program a Computer Numerical Control machine to select the proper speeds and feeds.
- d. Understand the production of a workplace maintaining dimensions to print tolerances on a Computer Numerical Control machine.
- e. Program and load CNC program using computer assist programming system.

OUTLINE OF INSTRUCTION:

- I. Introduction
 - A. Definition
 - 1) Numerical control
 - 2) Computer numerical control
 - B. Historical perspective
 - 1) Need for CNC machines
 - 2) Early machines (NC)
 - 3) Future of CNC
 - C. Types of CNC machine control
 - 1) Point-to-point machines
 - 2) Absolute dimensioning system
 - 3) Incremental dimensioning system
 - 4) Contour machines (continuous path)
 - D. Use of cartesian coordinate system
 - E. Types of CNC machines

- II. Basic principles of computer numerical control
 - A. Programming terms and procedures
 - B. Machine tool co-ordinate system
 - 1) Lathe
 - 2) Milling machine
 - 3) Input data
 - C. Code generation and description (G and M codes)
 - D. Canned cycles
 - E. Feed determination (F code)
 - F. Speed determination (S code)
 - G. Transferring a program from the machine to computer storage
 - H. Transferring a program from computer storage to the machine

- III. Machine operations
 - A. Lathe setup operations
 - 1) Turning
 - 2) Radius
 - 3) Threading
 - 4) Turning cycles
 - 5) Threading cycles
 - B. Milling machine setup and operations
 - 1) Origin
 - 2) Types of milling operations
 - 3) Software introduction

REQUIRED TEXTBOOKS AND MATERIALS:

Seams. Computer Numerical Control Concepts and Programming. 4th ed.

The instructor will use various handouts generated by Durham Tech for operation and programming of CNC mill.

STATEMENT FOR STUDENTS WITH DISABILITIES:

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class. Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 686-3652 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1309.