

Course Objectives/Course Outline
Spokane Community College

Course Title: CNC Theory I

Prefix and Course Number: MACH 211

Course Learning Outcomes:

By the end of this course, a student should be able to:

- Understand tool and work station offsets
- Show correct part reference selection
- Identify G & M codes and show their proper use
- Write basic G & M code for CNC Mills

Course Outline:

I. MACHINE CONFIGURATIONS

- A. Vertical machining centers
- B. Horizontal machining centers
- C. Directions of motion (vertical)
- D. Directions of motion (horizontal)

II. UNDERSTANDING PROGRAM ZERO AND COORDINATE SYSTEM

- A. Axes of a machining center
- B. XY plane
- C. Where to place the program zero point
- D. Incremental mode
- E. Absolute mode

III. THE THREE KINDS OF MOTION

- A. G00 Rapid motion
- B. G01 linear interpolation
- C. G02 and G03 Circular motion commands

IV. TYPES OF COMPENSATION

- A. Tool length compensation
- B. Cutter radius compensation
- C. Fixture offsets

V. CANNED CYCLES

- A. Description of each canned cycle

VI. SETUP AND OPERATION TASKS

- A. Operator responsibilities
- B. Sample setup sheet

- C. Make new workholding setup
- D. Assign program zero
- E. Measure and enter offsets for cutting tools
- F. Load CNC program
- G. Verify and optimize CNC program