

**Central Maine Community College
Auburn, Maine**

Precision Machining Technology
Summer 2016

5th Axis Teacher Training
Instructor: Devin Watson

Purpose and Organization:

This course will provide students the opportunity to program, set-up and operate 5th axis vertical CNC Milling Centers.

Course Objectives: This course will provide students the opportunity to:

1. Set-up and operate 5 axis Vertical CNC Milling Centers
2. Program parts for the 5 axis machining centers
3. Use probes and presetters to set offsets on the CNC mill

Student Learning Outcomes: At the conclusion of this course students will be able to:

1. Demonstrate the set-up and operation of Multi-axis CNC mills.
2. Understand programming and program editing for Multi-axis CNC mills.

Course Topics in Sequential Order:

5 axis

- Axis of rotation
- Types of multi-axis machines
 - o Table/Table
 - o Head/Table
 - o Head/Head
- Positioning Method
 - o Indexing
 - o Simultaneous motions
- Positions
 - o Machine Rotary Zero
 - o Program Zero
 - o Dynamic Fixture Offset
- Work holding
- Lead, Lag, Tilt angles
- Programming Changes
- Probing on Multi-axis Machines

Textbook and Required Supplies:

Students are required to wear OSHA approved safety shoes and OSHA approved safety glasses while working in the machine shop.

Tools and work material furnished by Central Maine Community College.

Schedule:

Date	Topic	Assignment/reading/activity	Approximate time on task
Day 1	5 axis	<input type="checkbox"/> Course overview <input type="checkbox"/> Lecture 1- 5 axis Overview <input type="checkbox"/> Program project 1 <input type="checkbox"/> Run Project 1	
Day 2	5 axis	Lecture 2- 5 axis programming changes Program Project 2 Run Project 2	
Day 3	5 axis	<input type="checkbox"/> Lecture 3- Probes and Tool setters <input type="checkbox"/> Program Project 3 <input type="checkbox"/> Run Project 3	
Day 4	5 axis	<input type="checkbox"/> Lecture 4- 5 axis considerations <input type="checkbox"/> Program Project 4 <input type="checkbox"/> Run Project 4	
Day 5	5 axis	<input type="checkbox"/> Program Project 5 <input type="checkbox"/> Run Project 5	