

Victoria Makerspace - CNC Router - Basic Course - Syllabus

This course is intended to teach a student that is new to CNC the basics of using a 2.5D CNC router. This course is not intended to teach CAD; it is expected that the student can produce a model or .dxf/ .svg file to create toolpaths on in VCarve.

Day 1

- 1.) CNC overview
- 2.) 2.5D CNC router capabilities
 - a. Project examples
 - b. Material selection
- 3.) CNC Safety
 - a. Safe work areas
 - b. Fire safety
 - c. Down spiral bits
 - d. Machine Zero
- 4.) Common router bits
 - a. Up spiral
 - b. Down spiral
 - c. Compression bit
 - d. V bit
 - e. Surfacing bit
 - f. Round over bit
- 5.) Routines and Orders of Operation
 - a. Engraving
 - b. Pockets
 - c. Drilling and pecking
 - d. Inside cuts
 - e. Outside cuts
- 6.) Work hold downs
 - a. T-Clamps
 - b. Screwing to surface
 - c. Nailing to surface
 - d. Carpet double sided tape
 - e. Tabs
- 7.) Positioning a Toolpath Start and Stop
- 8.) Conventional vs Climb Cutting
- 9.) Clean up cuts
 - a. Reverse cutting with offset

Day 2

- 1.) Intro to VCarve
 - a. CAD
 - b. CAM

- c. Post processing
- 2.) Machine Zero
 - a. Machine bed vs material surface
 - b. XYZ Coordinate system
- 3.) Feeds and speeds
- 4.) Entering tools
- 5.) Demonstration of setting up a new project in VCarve, creating tool paths, preview tool paths
- 6.) Preparing a file to send to the CNC controller
- 7.) GCode
 - a. Basic overview
 - b. Common modifications
 - c. Hazards of modifying
- 8.) Class period to work on course project

Day 3

- 1.) Machine Zero (This is being intentionally repeated, as it's likely the biggest hazard to machine damage)
- 2.) Tool changes
 - a. Which tool to start with
 - b. Zeroing and touch offs
- 3.) Overview of machine controls
 - a. Emergency stops
 - b. Over travel
 - c. Machine alarms
 - d. Importing a file
- 4.) Machine setup
 - a. Material alignment
- 5.) Machine maintenance
 - a. Dust collection
 - b. Coolant system
 - c. Ball screws
- 6.) Class period to work on course project

Day 4

- 1.) Nesting
- 2.) Students setup CNC and cut project file
- 3.) Post processing of cut pieces
 - a. Tab cutting
 - b. Round over bits for seamless pocket fitment
- 4.) Machine shutdown
- 5.) Machine cleanup

Check Out – to be booked on a future date with a CNC router checkout person

