

**Virginia Western Community College**  
**MEC 119**  
**Introduction to Basic CNC and CAM**

**Prerequisites**

MTE1, MTE 2, and MTE 3 or divisional approval.

**Corequisites**

none

**Course Description**

Teaches the basic concepts of Computer Numerical Control (CNC) programming of Numerical Control Machinery with emphasis on Computer Aided Manufacturing (CAM)/Computer Aided Drafting (CAD). Program writing procedures will be based on using the following: basic G-code programming language for CNC machinery, CAD/CAM programming systems to produce correct code for CNC Machinery, basic computer usage, CAD/CAM integration, and Code-to-machine transfer via Distributive Numeric Control (DNC).

**Semester Credits: 3 Lecture Hours: 2 Lab Hours: 2**

**Required Materials****Textbook:**

Introduction to Computer Numerical Control (CNC), 5th ed., Author: Valentino, Publisher: Pearson, ISBN: 9780132176033

Other resources provided by instructor

**Software:**

None

**Other Required Materials:**

OSHA approved eyewear

**Course Outcomes**

At the completion of this course, successful students will

- Demonstrate the ability to perform precision measurements and understand tolerances
- Demonstrate safe operation of basic manual machine tools
- Calculate and apply safe cutting feeds and speeds

- Demonstrate drilling operations at specified locations
- Complete a project using milling machines and engine lathes
- Understand the relationship between CAD and CAM
- Understand CNC programming concepts including linear & arc moves, absolute & relative positioning
- Create a CNC program by hand to write a simple part program
- Demonstrate the setup and operation of CNC engraving operations
- Understand the application of CAM systems to the manufacturing process
- Demonstrate proficiency and teamwork skills in the laboratory.

### **Topical Description**

- Precision measurement using steel rules, calipers and micrometers.
- Safety review and operation of drill press.
- Review of basic drafting and blueprint reading skills.
- How to read and specify tolerances.
- Process Sheets
- Safety review and operation of horizontal saw.
- Types of tooling and cutters.
- Materials and hardness.
- Safety review and operation of engine lathe.
- Formulation for cutting feeds and speeds.
- Safety review and operation of vertical mill.
- Thread specifications.
- Basic G & M codes.

### **Notes to Instructors**

Beginning Fall 2020, VWCC will require students to have a computer or reliable access to a computer, capable of participation in an online format. Online courses at Virginia Western require a significant amount of interaction with Canvas, the Learning Management System, and many require real-time class sessions using the Zoom web-conferencing tool. To be successful in online classes, students must have substantial access to a computer with hi-speed internet connectivity. The expected requirements are listed on the college webpage.

**This course is taught at Roanoke County Schools Burton Center for the Arts and Technology campus. The computer labs are not connected with those at VWCC. Students are not on the VWCC campus during these evening classes.**

[ADA Statement \(PDF\)](#)

[Title IX Statement \(PDF\)](#)