

Common Course Outline
CAMM 252
CNC Milling Machine Operation
3 Credits

Community College of Baltimore County

Description

CAMM 252 – CNC Milling Machine Operation discusses theory and operation of Computerized Numerical Control (CNC) milling equipment in a production environment, which includes machine control alignment, fixed cycle subroutine usage, CRT layout, hands on operation, and demonstrations on CNC Machining Centers.

3 Credits

Prerequisites: CAMM 111 with a passing grade of “C” or higher or NIMS “Measurement, Material and Safety” certification and CAMM 101 with a passing grade of “C” or higher.

Overall Course Objectives

Upon completion of this course, students will be able to:

1. set part zero using fixture offsets;
2. set tool height and tool diameter offsets;
3. safely operate a CNC machining center;
4. write a working part program for a CNC machining center using absolute and incremental positioning;
5. construct programs using subroutines and canned cycles;
6. write a program using cutter compensation;
7. demonstrate safe and practical machining techniques;
8. use formulas to calculate RPM, IPR, IPM, HP, and radial engagement factors and circular interpolation reduction factors;
9. identify the 3 basic machine axis;
10. identify tools used on a CNC mill in a production setting;
11. identify the G and M codes used to program a CNC machining center;
12. have the opportunity to earn the NIMS Level 1 “CNC Milling Operations” certification;
and
13. prepare for the National Institute of Metalworking Skills (NIMS) Level 1 CNC Milling: Programming and Operations” certification.

Major Topics

- I. Principles of CNC Milling
 - A. Linear interpolation
 - B. Speeds and feeds
 - C. Program storage and retrieval
 - D. Cutter compensation

- II. Subroutines and Fixed Cycles
 - A. Drilling cycles
 - B. Tapping cycles
 - C. Helical interpolation
- III. Advanced Programming
 - A. Writing subroutines and subprograms
 - B. Parametric programming
 - C. Macro programming
- IV. Cutting Material
 - A. High speed machining
 - B. Dry machining
 - C. Basic metallurgy
 - D. Analyzing tool failure
 - E. Copy milling

Course Requirements

Grading procedures will be determined by the individual faculty member but will include the following:

Grading/exams

- Minimum of 2 milling projects
- Minimum of 2 quizzes
- Minimum of 8 homework assignments
- 1 Midterm
- 1 Final exam

Written Assignments: Students are required to use appropriate academic resources.

Other Course Information

This course is taught in a computerized and lab environment.