

Master Syllabus

CAM 1116 - Fundamentals of Computer Numerical Control Operations

Division: Science, Mathematics and Engineering

Department: Computer Aided Manufacturing

Credit Hour Total: 3.0

Lecture Hrs: 2.0 **Lab Hrs:** 2.0

Date Revised: April 2014

Course Description:

This course will cover machine safety, setup and operation of computer numerical control (CNC) milling machines and lathes. Adjusting tool and work offsets to hold part tolerances on both types of equipment. Calculation of spindle speeds and feed rates. Introduction to basic programming codes and development of CNC programs for three axis mills and two axis lathes. Two classroom, two lab hours per week.

General Education Outcomes:

- Critical Thinking/Problem Solving Competency
- Computer Literacy Competency
- Information Literacy Competency

Course Outcomes:

Set-up and run CNC Mills and Lathes

Utilizing a process plan and CNC program, setup (student teams) the CNC milling machine with all tools and fixtures, program and manufacture the part.

Assessment Method: Behavioral observations

Performance Criteria:

Using instructional materials, the students (in teams) must correctly identify and set all (100%) tool offsets, work offset and program.

Assessment Method: Performance appraisals

Performance Criteria:

Work offset must be within .010" of actual location. Tool offsets must be within .005". All (100%) of part features must be within tolerance of part not to exceed .005".

Process Planning

Analyze part and develop an appropriate manufacturing operations process plan utilizing tooling for CNC milling machine.

Assessment Method: Performance appraisals

Performance Criteria:

At least 70% of all part features must be linked to correct process at first submission.

Assessment Method: Portfolios

Performance Criteria:

00% of process plans will become part of the course portfolio.

Part Programming

Following an operations process plan, write and debug a CNC program for a three axis CNC milling machine and a two-axis CNC lathe.

Assessment Method: Performance appraisals

Performance Criteria:

At least 70% of all CNC programs must be without errors that would cause incorrect cutting of part feature, damage to tool or machine.

Assessment Method: Portfolios

Performance Criteria:

100% of original (draft) and final program printouts will become part of their course portfolio.

Outline:

Safety procedures in the CNC shop

CNC metalworking terminology

Cartesian coordinate system

Machine setup and operation

Tool setup and offsets

Development of a process plan

