

Master Syllabus

CAM 1213 - Fundamentals of Computer Numerical Control

Division: Science, Mathematics and Engineering

Department: Computer Aided Manufacturing

Credit Hour Total: 4.0

Lecture Hrs: 3.0 **Lab Hrs:** 2.0

Prerequisite(s): CAM 1109 OR CAM 1161 AND MET 1131

Date Revised: October 2013

Course Description:

Development of Computer Numerical Control (CNC) programs for three axis CNC milling machines including linear and circular interpolation, drilling and tapping and G&M codes. Setup and operation of milling machines. Adjusting tool offsets to hold part tolerance. Three classroom, two lab hours per week.

General Education Outcomes:

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

Course Outcomes:

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 by all students

Assessment Method: Portfolios

Performance Criteria: 100% of process plans will become part of the course portfolio

Part Programming

Following an operations process plan, write and debug a CNC program for the CNC milling machine.

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 the course portfolio

Setup and Operation

Utilizing the process plan and CNC program, setup the CNC milling machine (student teams) 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 tool offsets, work offset and program at 100%.

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.

Outline:

Safety procedures in the CNC shop
Cartesian coordinate system
CNC and metalworking terminology
Program codes, development and editing
Development of process plan
Machine setup and operation
Tool setup and offsets