

## Master Syllabus

### CAM 1214 - Computer Numerical Control Mill Programming

**Division:** Science, Mathematics and Engineering

**Department:** Computer Aided Manufacturing

**Credit Hour Total:** 3.0

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

**Prerequisite(s):** CAM 1109OR CAM 1161AND MET 1131OR OPT 1198AND CAM 1116

**Date Revised:** January 2015

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#### Course Description:

This is an intermediate course covering the development of Computer Numerical Control (CNC) programs for three axis milling machines including spindle controls, tool changes, linear and circular interpolation, drilling and tapping, subroutines, and G&M codes. Setup and operation of milling machines. Adjusting tool and work offsets to hold part tolerance. Two classroom, two lab hours per week.

#### General Education Outcomes:

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

#### Course Outcomes:

##### Machine Setup and Operation

Student teams, utilizing a process plan and CNC program, will setup the CNC milling machine with all tools and fixtures, program and manufacture the part.

**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.

##### Part Programming

Students following an operations process plan will 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 the part feature, damage to tool or machine. 100% of the original (draft) and final program printouts will become part of the course portfolio.

##### Process Planning

Students will analyze a part and develop an appropriate manufacturing operations process plan utilizing standard 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. 100% of process plans will become part of the course portfolio.

#### Outline:

Safety procedures in a machine shop  
Cartesian coordinate system applied to the vertical mill  
Development of a process plan  
Programming codes; Program development and editing  
Machine and tool set-up and operation  
Adjusting tool offsets to hold tolerance