Washtenaw Community College Comprehensive Report

NCT 255 Probes, Macros and Conversational Programming for CNC
Effective Term: Fall 2016

Course Cover

Division: Advanced Technologies and Public Service Careers
Department: Industrial Technology
Discipline: Numerical Control
Course Number: 255
Org Number: 14400
Full Course Title: Probes, Macros and Conversational Programming for CNC
Transcript Title: Probes,Macros Convers CNC Mach
Is Consultation with other department(s) required: No
Publish in the Following:
Reason for Submission: New Course
Change Information:
Rationale: This class is being created for an advanced certificate in the advanced manufacturing program. This course is needed to get students skills to operate new equipment being purchased for our program.
Proposed Start Semester: Fall 2016
Course Description: In this course, students will learn the fundamentals of intuitive probing system (IPS) and visual quick code (VQC) for creation of probing cycles for CNC machine tools. The offset tool setter (OTS), the optical measurement probe (OMP) outputs and user defined inspection routines will be integrated into part programs. Students will setup and calibrate the OTS for various operational settings as well as understand the method for calibrating the OMP.

Course Credit Hours

Variable hours: No
Credits: 4
Lecture Hours: Instructor: 45 **Student:** 45
Lab: Instructor: 45 **Student:** 45
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90
Repeatable for Credit: NO
Grading Methods: Letter Grades
Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

No Level Required

Requisites

Prerequisite
NCT 121 minimum grade "c"
and
Prerequisite
NCT 221

or
Level II Prerequisite
Industry CNC machining experience.

General Education

Request Course Transfer
Proposed For:

Student Learning Outcomes

1. Apply the intuitive probing system (IPS) for the set-up of a part, and use visual quick codes (VQC) for creation of a machine tool program.
   Assessment 1
   Assessment Tool: Capstone project
   Assessment Date: Fall 2016
   Assessment Cycle: Every Three Years
   Course section(s)/other population: all
   Number students to be assessed: all
   How the assessment will be scored: departmentally-developed rubric
   Standard of success to be used for this assessment: 75% of the students will score 75% or greater.
   Who will score and analyze the data: Department Faculty

2. Integrate offset tool setter (OTS)and optical measurement probing (OMP) lines into programs for verification of tool conditions and optimizing cutting operations.
   Assessment 1
   Assessment Tool: Capstone project
   Assessment Date: Fall 2019
   Assessment Cycle: Every Three Years
   Course section(s)/other population: all
   Number students to be assessed: all
   How the assessment will be scored: departmentally-developed rubric
   Standard of success to be used for this assessment: 75% of the students will score 75% or greater.
   Who will score and analyze the data: Department Faculty

3. Apply the calibration process for alignment of the optical measurement probe to stage the offset tool setter (OTS) for use in various machining setups (5 axis machining).
   Assessment 1
   Assessment Tool: Capstone project
   Assessment Date: Fall 2019
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: departmentally-developed rubric
   Standard of success to be used for this assessment: 75% of the students will score 75% or greater.
   Who will score and analyze the data: Department Faculty

Course Objectives
1. Apply fundamentals of probing using IPS at MCU to set of height, CDC and work offsets.
2. Apply fundamentals of probing using IPS at MCU to define tool types, tool lengths and breakage detection.
3. Use Visual Quick Code for machining part features, location of external/internal corners, location of external/internal centers, location of single surface, and rotational information.
4. Create basic macros with input/use of variables, mathematical expressions, logical

statements, structures and G65 alias.
5. Use basic macros to write programs for families of parts.
6. Create system macros: OTS macros for tool detection, OMP macros for part location, and OMP macros for inspection.
7. Apply principles of setup and calibration of the OTS system: maintain the OTS, assemble the OTS to machine table, and calibrate the OTS.
8. Apply principles of setup and calibration of OMP system: maintain the OMP, assemble the ceramic stylus to body, and align the stylus.

New Resources for Course
Currently Purchasing new equipment with offset tool setters and optical measurement probes.

Course Textbooks/Resources
Textbooks
Manuals
Periodicals
Software

Equipment/Facilities
Level III classroom
Computer workstations/lab

Reviewer	Action	Date
Faculty Preparer:		
Thomas Penird	*Faculty Preparer*	*Aug 29, 2015*
Department Chair/Area Director:		
Thomas Penird	*Recommend Approval*	*Aug 29, 2015*
Dean:		
Brandon Tucker	*Recommend Approval*	*Oct 06, 2015*
Curriculum Committee Chair:		
Kelley Gottschang	*Recommend Approval*	*Nov 30, 2015*
Assessment Committee Chair:		
Michelle Garey	*Recommend Approval*	*Dec 01, 2015*
Vice President for Instruction:		
Michael Nealon	*Approve*	*Dec 14, 2015*