Washtenaw Community College Comprehensive Report

NCT 121 Manual Programming and NC Tool Operation
Effective Term: Fall 2022

Course Cover

College: Advanced Technologies and Public Service Careers
Division: Advanced Technologies and Public Service Careers
Department: Advanced Manufacturing
Discipline: Numerical Control
Course Number: 121
Org Number: 14450
Full Course Title: Manual Programming and NC Tool Operation
Transcript Title: Manual Programming NC Tool
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: Course Change
Change Information:
    Pre-requisite, co-requisite, or enrollment restrictions
    Outcomes/Assessment
Rationale: Removal of MTT 102 as pre-req. MTT102 has been inactivated. NCT100 is the replacement and is a pre-req for the NCT101/110 course already required but may not enroll concurrently. The coursepack is also no longer used.
Proposed Start Semester: Fall 2022
Course Description: In this course, students will interpret working drawings of sample parts, write and edit programs, setup and operate CNC machine tools, and inspect the finished products in the process of manufacturing parts. Feeds and speeds, fixed cycles, program editing, set up procedures, and program preparation are major topics presented. This is the first in a two-course study of manual programming of CNC milling and turning centers. Students with experience equivalent to NCT 101 and NCT 110 may contact the instructor for permission to waive the prerequisites. Programming time outside of the classroom is required to be successful in this course.

Course Credit Hours

Variable hours: No
Credits: 4
Lecture Hours: Instructor: 30 **Student:** 30
Lab: Instructor: 60 **Student:** 60
Clinical: Instructor: 0 **Student:** 0

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

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Level 4

Requisites
Prerequisite
NCT 101 minimum grade "C"
and
Prerequisite
NCT 110 minimum grade "C"

General Education
General Education Area 7 - Computer and Information Literacy
Assoc in Arts - Comp Lit
Assoc in Applied Sci - Comp Lit
Assoc in Science - Comp Lit

Request Course Transfer
Proposed For:

Student Learning Outcomes

1. Construct programs using G-code and M-code machine tool language in proper module format.
   Assessment 1
   Assessment Tool: Outcome-related capstone projects
   Assessment Date: Fall 2023
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: The capstone project will be scored using the departmentally-developed rubric.
   Standard of success to be used for this assessment: 75% of the students will score 70% or higher on the capstone project.
   Who will score and analyze the data: Departmental faculty

2. Apply the appropriate process for machining a product from start to finish.
   Assessment 1
   Assessment Tool: Outcome-related capstone projects
   Assessment Date: Fall 2023
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: The capstone project will be scored using the departmentally-developed rubric.
   Standard of success to be used for this assessment: 75% of the students will score 70% or higher on the capstone project.
   Who will score and analyze the data: Departmental faculty

3. Troubleshoot and debug programs at the CNC machine tool controllers yielding parts to specification.
   Assessment 1
   Assessment Tool: Outcome-related department exam questions
   Assessment Date: Fall 2023
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: The department exam will be scored using an answer sheet.

Standard of success to be used for this assessment: 75% of the students will score 70% or higher on the exam.

Who will score and analyze the data: Departmental faculty

Assessment 2

Assessment Tool: Outcome-related capstone projects

Assessment Date: Fall 2023

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: The capstone project will be scored using the departmentally-developed rubric.

Standard of success to be used for this assessment: 75% of the students will score 70% or higher on the capstone project.

Who will score and analyze the data: Departmental faculty

Course Objectives

1. Apply appropriate G-codes and M-codes to produce holes of various types and depth into different materials, using varying peck and dwell cycle and return plane conditions at the mill or lathe.
2. Apply appropriate G-codes and M-codes to produce patterns of holes at the mill.
3. Apply appropriate G-codes and M-codes to produce slots of varying depth into parts at the mill.
4. Apply appropriate G-codes and M-codes to produce linear and circular profile paths using cutter diameter compensation to control feature size into parts at the mills and lathes.
5. Apply appropriate G-codes and M-codes to produce circular pockets at the mills.
6. Apply appropriate G-codes and M-codes to produce irregular pockets, with and without islands, at the mills.
7. Apply appropriate G-codes and M-codes to face materials of part at the lathe.
8. Apply appropriate G-codes and M-codes to produce outside and inside contours on cylindrical parts at the lathes using roughing and finishing cycles.
9. Locate tool center positions about the part using geometry, algebra and trigonometry.
10. Create documentation to correspond to written programs for use by setup operators.
11. Create works to replace construct in all locations.

New Resources for Course

Course Textbooks/Resources

Textbooks
Manuals
Periodicals
Software

Equipment/Facilities

Level III classroom

Reviewer	Action	Date
Faculty Preparer:		
Allan Coleman	*Faculty Preparer*	*Jan 26, 2022*
Department Chair/Area Director:		
Allan Coleman	*Recommend Approval*	*Jan 26, 2022*
Dean:		
Jimmie Baber	*Recommend Approval*	*Jan 26, 2022*
Curriculum Committee Chair:		
Randy Van Wagnen	*Recommend Approval*	*Feb 22, 2022*

Assessment Committee Chair:

Shawn Deron   *Recommend Approval*   *Feb 23, 2022*

Vice President for Instruction:

Kimberly Hurns   *Approve*   *Feb 23, 2022*

Washtenaw Community College Comprehensive Report

NCT 121 Manual Programming and NC Tool Operation
Effective Term: Fall 2014

Course Cover
Division: Advanced Technologies and Public Service Careers
Department: Industrial Technology
Discipline: Numerical Control
Course Number: 121
Org Number: 14450
Full Course Title: Manual Programming and NC Tool Operation
Transcript Title: Manual Programming NC Tool
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: Course Change
Change Information:
   Consultation with all departments affected by this course is required.
Rationale: Conditionally approved - seeking full approval.
Proposed Start Semester: Winter 2014
Course Description: This is the first in a two-course study of manual programming of CNC milling and turning centers. Students experience the entire process of part manufacturing by processing working drawings of sample parts, writing and editing of programs, set up and operation of CNC machine tools, and inspection of the finished products. Feeds and speeds, fixed cycles, program editing, set up procedures, and tape preparation are major topics presented. Laboratory time is required outside of class time. Students with experience equivalent to NCT 101 and NCT 110 may contact the instructor for permission to waive the prerequisites.

Course Credit Hours
Variable hours: No
Credits: 4
Lecture Hours: Instructor: 30 **Student:** 30
Lab: Instructor: 60 **Student:** 60
Clinical: Instructor: 0 **Student:** 0

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

College-Level Reading and Writing
College-level Reading & Writing

College-Level Math
Level 4

Requisites
Prerequisite
MTT 102 minimum grade "C"
and

Prerequisite
NCT 101 minimum grade "C"; may enroll concurrently
and
Prerequisite
NCT 110 minimum grade "C"; may enroll concurrently

General Education
General Education Area 7 - Computer and Information Literacy
Assoc in Arts - Comp Lit
Assoc in Applied Sci - Comp Lit
Assoc in Science - Comp Lit

Request Course Transfer
Proposed For:

Student Learning Outcomes

1. Construct programs using G&M machine tool language in proper module format.
   Assessment 1
   Assessment Tool: Capstone Projects
   Assessment Date: Fall 2015
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: The capstone project will be scored using the departmentally-developed rubric.
   Standard of success to be used for this assessment: 75% of the students will score a minimum of 70% or higher on the capstone project.
   Who will score and analyze the data: Department Faculty

2. Apply the appropriate process for machining a product from start to finish.
   Assessment 1
   Assessment Tool: Capstone Projects
   Assessment Date: Fall 2015
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: The capstone project will be scored using the departmentally-developed rubric.
   Standard of success to be used for this assessment: 75% of the students will score a minimum of 70% or higher on the capstone project.
   Who will score and analyze the data: Department Faculty

3. Troubleshoot and debug programs at the CNC machine tool controllers yielding parts to specification.
   Assessment 1
   Assessment Tool: Capstone Projects
   Assessment Date: Fall 2015
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All
   Number students to be assessed: All
   How the assessment will be scored: The capstone project will be scored using the departmentally-developed rubric.
   Standard of success to be used for this assessment: 75% of the students will score a minimum of 70% or higher on the capstone project.
   Who will score and analyze the data: Department Faculty

Assessment 2
    Assessment Tool: Department Exam
    Assessment Date: Fall 2015
    Assessment Cycle: Every Three Years
    Course section(s)/other population: All
    Number students to be assessed: All
    How the assessment will be scored: The department exam will be scored using an answer sheet.
    Standard of success to be used for this assessment: 75% of the students will score a minimum of 70% or higher on the exam.
    Who will score and analyze the data: Department Faculty

Course Objectives

1. Apply appropriate G & M codes to produce holes of various types and depth into different materials, using varying peck and dwell cycle and return plane conditions at the mill or lathe.
   Matched Outcomes
   1. Construct programs using G&M machine tool language in proper module format.
2. Apply appropriate G & M codes to produce patterns of holes at the mill.
   Matched Outcomes
   1. Construct programs using G&M machine tool language in proper module format.
3. Apply appropriate G & M codes to produce slots of varying depth into parts at the mill.
   Matched Outcomes
   1. Construct programs using G&M machine tool language in proper module format.
4. Apply appropriate G & M codes to produce linear and circular profile paths using cutter diameter compensation to control feature size into parts at the mills and lathes.
   Matched Outcomes
   1. Construct programs using G&M machine tool language in proper module format.
5. Apply appropriate G & M codes to produce circular pockets at the mills.
   Matched Outcomes
   1. Construct programs using G&M machine tool language in proper module format.
6. Apply appropriate G & M codes to produce irregular pockets, with and without islands, at the mills.
   Matched Outcomes
   1. Construct programs using G&M machine tool language in proper module format.
7. Apply appropriate G & M codes to face materials of part at the lathe.
   Matched Outcomes
   1. Construct programs using G&M machine tool language in proper module format.
8. Apply appropriate G & M codes to produce outside and inside contours on cylindrical parts at the lathes using roughing and finishing cycles.
   Matched Outcomes
   1. Construct programs using G&M machine tool language in proper module format.
9. Locate tool center positions about the part using geometry, algebra and trigonometry.
   Matched Outcomes
   1. Construct programs using G&M machine tool language in proper module format.
10. Create documentation to correspond to written programs for use by set-up operators.
    Matched Outcomes
    1. Construct programs using G&M machine tool language in proper module format.

New Resources for Course
Course Textbooks/Resources
    Textbooks
    Manuals
    Periodicals
    Software
    Equipment/Facilities
        Level III classroom

Reviewer	Action	Date
Faculty Preparer:		
Thomas Penird	*Faculty Preparer*	*Dec 19, 2013*
Department Chair/Area Director:		
Thomas Penird	*Recommend Approval*	*Dec 19, 2013*
Dean:		
Marilyn Donham	*Recommend Approval*	*Jan 10, 2014*
Vice President for Instruction:		
Bill Abernethy	*Approve*	*Feb 10, 2014*